S. HRG. 101-569

HEALTH EFFECTS OF PESTICIDE USE ON CHILDREN

HEARING

BEFORE THE

SUBCOMMITTEE ON
CHILDREN, FAMILY, DRUGS AND ALCOHOLISM

OF THE

COMMITTEE ON
LABOR AND HUMAN RESOURCES
UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

ON

EXAMINING THE EFFECTS ON CHILDREN OF THE CONSUMPTION OF FRUITS AND VEGETABLES GROWN WITH AND CONTAINING RESIDUES OF AGRICULTURAL CHEMICALS

MARCH 16, 1989

Printed for the use of the Committee on Labor and Human Resources

U.S. GOVERNMENT PRINTING OFFICE

20-138 ⇆ WASHINGTON : 1990

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

S541-30

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HEALTH EFFECTS OF PESTICIDE USE ON CHILDREN

THURSDAY, MARCH 16, 1989

U.S. SENATE,
SUBCOMMITTEE ON CHILDREN,
FAMILY, DRUGS AND ALCOHOLISM, OF THE
COMMITTEE ON LABOR AND HUMAN RESOURCES,
Washington, DC.

The subcommittee convened, pursuant to notice, at 10:14 a.m., in room SD-430, Dirksen Senate Office Building, Senator Christopher J. Dodd (chairman of the subcommittee) presiding.

Present: Senators Dodd, Harkin, Adams, Hatch, Thurmond, Coats, and Lieberman (ex officio).

OPENING STATEMENT OF SENATOR DODD

Senator DODD. Welcome to the Senate Subcommittee on Children, Family, Drugs and Alcholism and their first official forum on health effects of pesticide use on children.

Today's hearing will focus on one chemical in particular, Alar, and the effect of its use in apple products on American infants and children.

Let me first of all thank the chairman of the full committee, Senator Kennedy; the ranking minority member, Senator Hatch, and others, for their work in this area and others related to health issues and for their willingness to participate in today's hearing.

Most American families, of course, are familiar with the story of Snow White, the beautiful young girl of Walt Disney fame whose evil stepmother enticed her to eat a bright and shiny red apple.

Well, life is no fairy tale, but some believe that that story has come to life in supermarkets and corner groceries around the country; that lurking in the shiny apples in the grocers' produce section or in the apple juice which American infants and children drink every day is a latent poison more deadly than anything Snow White could possibly have imagined.

Others believe that Snow White is just what it was—a fantasy, a movie—that the Alarm which has been sounded around the Nation this week is premature hysteria, based on inconclusive data and rash judgments.

Our purpose here today is to get the facts before the American people. Does an apple a day keep the doctor away, or could it put you in the hospital years after you eat it?

We will not decide this issue today. What I hope we will do is identify the issues clearly and inform the American consumers of the real risks involved.

Like other chemicals used in produce, Alar is meant to make apples look more appealing and uniform in size and color. But a recent study by the Natural Resources Defense Council concludes that it poses a long-term risk of cancer in those who ingest it. The Natural Resources Defense Council believes Government agencies simply must be more active in moving to ban its use.

The makers of Alar take the opposite view—that there is no conclusive evidence that Alar poses a cancer risk and that the issue merits further study.

Then there are the apple producers and processors, caught between the desire to offer a product which is attractive physically and the need to offer one which is safe for consumers. Really caught, as usual, are the American consumers themselves—caught in the media blitz of conflicting claims and evidence.

The result has been a swift public reaction which some would call caution and others over-reaction. Several major school districts in this country have already banned the sale of apple products.

Why are we so concerned about children? Well, first of all, that is this subcommittee's business—the health and welfare of American children. But it is far more than that. Apples are a uniquely children's food. Apple juice, applesauce, whole fresh apples—kids under 4 eat 10 times as many apple products by volume as adults.

But it is even more than that. If there is a serious health risk from Alar, it is even more serious for children than for adults. But many believe that the studies experts conduct to measure the risks are relevant for adults and not for children. The problem is that children are not little adults; they eat much more apple product on average and have much more sensitive and susceptible physiologies which could be adversely affected.

I believe we have three goals here today on behalf of American children and their families. First, we need to re-examine the role of pesticides and chemicals like Alar and the potential trade-off society makes through their use. Do we use these chemicals because they make for better and safer products, or because they make the product look good?

Second, we have a broad range of experts and perspectives represented here today to help us assess the actual health risks to children which Alar poses; what are the risks, and how can we help parents who may be following this debate make educated choices for their families.

And third, we need to decide if our regulatory system is able to identify these risks, especially to children, and to make timely, effective and enforceable decisions once those risks are measured. If not, what changes in Federal law need to be made to make the system more responsive to situations like this?

At this point I will insert in the record a statement by Senator Kennedy.

[The prepared statement of Senator Kennedy follows:]

PREPARED STATEMENT OF SENATOR KENNEDY

The CHAIRMAN. The Federal Government has a responsibility to assure the safety of our Nation's food supply. Unfortunately, we have not done a very good job. Clearly, new authority is needed to stop the use of dangerous pesticides, and replace them with those that do not cause cancer.

Consumers are increasingly concerned about the safety of their food. A recent opinion poll conducted by the Food Marketing Institute revealed that the public considers pesticide residues among the most serious hazards affecting food safety. Last year, according to a food industry poll, 76 percent of the public found pesticide residues a "serious hazard." An additional 20 percent of those polled rated pesticides in food "something of a hazard."

Reports from government and the private sector underscore the public's concern. The recently issued report from the Natural Resources Defense Council concerning the risk to children from cancer-causing pesticide residues on foods has been widely referenced. The risks from the 23 pesticides discussed in this study are truly intolerable.

In 1987, the National Academy of Sciences reported that legal applications of only 28 food use pesticides could lead to cancers for up to six individuals for every thousand people exposed for a lifetime. The Environmental Protection Agency has identified at least 25 other carcinogenic pesticides which are legally used on food. In 1988, a book entitled *Pesticides Alert*, written by NRDC revealed that washing may not remove pesticide residues most often found in 26 common fruits and vegetables. In 1986 Congress' investigative arm, the General Accounting Office, reported that the usual analytic techniques used by the Food and Drug Administration to monitor for pesticides in food can identify only 40 percent of the pesticides which the Agency classifies as posing moderate to high health hazards.

As reports and analyses of the dangers of pesticides in food continue to be discussed and debated, one thing is clear—the current law is not ensuring that all Americans are eating safe food. The Environmental Protection Agency's activity under the Federal Food, Drug and Cosmetic Act (FFDCA) to set tolerances, or limits on the allowable concentrations of pesticides in food, has not incorporated all new health and safety data about pesticides used in agriculture. EPA has a very large task in the years ahead to ensure that legal food is in fact safe food.

I intend to introduce legislation next month to significantly enhance the safety of our Nation's food supply. This legislation will establish tolerance levels for pesticide residues on foods, and direct the Environmental Protection Agency and the Food and Drug Administration to remove from use cancer-causing pesticides.

This legislation will amend and enhance the EPA's current authority under the FFDCA to set tolerances for pesticides that may remain in food. The bill also makes many important improvements in both EPA procedures and authorities which will help improve the public's confidence in the safety of our food supply.

Improvement in our food safety laws to protect the public from potentially dangerous pesticide residues is vitally needed and long

overdue. This bill will enhance our ability to safeguard the public health while giving due weight to the interests of farmers, the food industry and chemical companies. I intend to work with all parties to ensure the enactment of food safety legislation at the earliest possible opportunity. And I look forward to having Senators Dodd and Hatch as original cosponsors of this bill.

Even though I cannot remain to hear testimony from the excellent witnesses you have invited, I look forward to reviewing their written statements. I am particularly sorry that I will not be able to listen to the expert testimony of the Massachusetts Commissioner of Public Health, Dr. Debra Prothrow-Stith. I have always valued her counsel and advice.

Senator DODD. I am delighted that we have several colleagues with us this morning, but before I turn to them, I would like to ask the ranking minority member of the subcommittee, Senator Coats of Indiana, and any other members of the committee if they would care to make an opening statement.

OPENING STATEMENT OF SENATOR COATS

Senator COATS. Thank you, Mr. Chairman, and I will be brief.

I am a parent, as many of us on this panel are, and when anyone raises the issue of health dangers to children, I think we take an extra interest, and it is imperative to get the facts as quickly and responsibly as possible. That is the reason why we are here today. It is important that we are here. We simply cannot tolerate putting our children at risk through adverse or unwanted pesticide use. But we also cannot tolerate hysteria and half-truths that often obscure rather than enlighten this type of issue.

Our first concern in these hearings from beginning to end must be the health and welfare of children. If the risk is real, if they are in danger, nothing will count on the other side of the balance. We would be forced to put out the alert, warning parents and taking whatever action is necessary.

But on this type of issue, especially on this type of issue, we cannot allow ourselves to be ruled by questionable evidence and overstatement. We have a responsibility not to feed fears without sound reasons, and we must always remember there are other people involved with real and legitimate concerns; people in low-income families who depend on fresh produce as a low-cost source of nutrition; people who depend for their livelihood on the produce industry.

In this hearing we need to be asking the tough questions that will inform a reasoned, prudent decision on Alar.

Mr. Chairman, I would like to ask unanimous consent to insert in the record several articles which do not necessarily represent the side that I am taking in this hearing, but hopefully present that balanced view.

Senator DODD. Without objection, so ordered.

[Information referred to is retained in the files of the subcommittee.]

Senator DODD. Senator Adams.

Opening Statement of Senator Adams

Senator Adams. Thank you, Mr. Chairman.

As a member of this committee, I am very concerned from two perspectives, both as a parent of four and as a grandparent of three, and I mention that because there is at risk, as we all know, the very small children, those eating applesauce and other processed products.

I viewed the "60 Minutes" story with a great deal of concern, but from two different and, I think, compatible interests. First, as a father and grandfather, as I mentioned, we feel the pangs that any parent feels when their children may be in danger. Fresh fruits and vegetables are vital to children's health and development, and any indication that these foods may be unsafe causes each of us great concern.

But also as senior Senator from the State of Washington, a major apple-producing State, I feel concern for the apple growers and processors, many of whom voluntarily, Mr. Chairman, stopped using Alar or accepting Alar-treated apples several years ago; yet they will be devastated by an overall boycott of all apple and apple products. That is what has been occurring.

I feel there is a compatibility, and that is what this committee will be working on, and I hope the American people and the EPA and the businesses involved will be working on. Nobody—parents, apple growers, processors—who market apple juice or applesauce wants to see a dangerous product on the market. I think that is a given, and we should all start from that basis.

We all realize that under our laws, the process of determining if a chemical is dangerous and then removing that chemical from the market takes time. I think we should be looking, Mr. Chairman, toward shortening that time because of the proliferation of technical advances in not just the farm, pesticide and treatment area, but in the whole area of chemicals, and I know that is something the chairman wants to address in this committee.

It is my personal opinion that Uniroyal, a manufacturer and a private concern—this is my personal opinion—would do us all a great public service if they suspended production of the chemical until the controversy on the product safety is resolved. That allows the processors and those who are using apple products to avoid boycotts while this is being determined. Otherwise we are going to have a very small group of people covering a very large market and the inability of people who are looking after children's welfare to immediately test and for EPA to test. So I would hope they will address that and they will do it.

This is not because I know that Alar is dangerous, because this remains to be determined in the scientific process. It is because I believe, Mr. Chairman, that a prolonged controversy over Alar is harmful. It is harmful to children and parents, who are not sure that apples are safe, and harmful to apple growers and processors attempting to market their product.

I also urge the EPA to complete the cancellation process whichever way it is going to go as quickly as possible to remove the uncertainty from a huge number of people, both processors and those who are consuming.

Until then, of course, my interest will be in protecting those who are put at risk by the uncertainties of the process. Parents who are concerned about Alar should be able to know that the apple products their children eat, whether through school lunch programs or at home, are free of Alar. It would be a shame if through this controversy children were denied access to one of our most delicious and nutritious foods—it is a basic staple in the school lunch program—or become terrified that something might make them sick, when that is not the case.

The apple growers of the State of Washington, most of whom do not use Alar, and major processing companies like Treetop, who stopped accepting apples treated with Alar 3 years ago, should be able to market Alar-free products without the stigma carried across that their product is dangerous.

Mr. Chairman, I commend you for holding these hearings. There is a clear need for a calm, unbiased examination of this issue, and this hearing is an excellent start. I intend to listen carefully to what these witnesses have to say, and Mr. Chairman, we have checked and followed this carefully, because all of us who are involved both with processing and with our children, try to stay up-to-date.

I would like to ask unanimous consent that a letter from the Department of Agriculture, dated March 16, 1989, reporting on this product be made a part of the record at this point.

Senator DODD. Without objection, so ordered.

Senator ADAMS. I thank the chairman.

[The letter from the U.S. Department of Agriculture follows:]

LETTER FROM DR. KENNETH A. GILLES, ASSISTANT SECRETARY, MARKETING AND INSPECTION SERVICES

On behalf of the United States Department of Agriculture, I wish to reassure you of the safety of raw apples, processed apples, and apple products.

The USDA commitment to continue to provide access to a safe, wholesome food supply for the people of America and our foreign customers is a high priority. Strict enforcement and application of the statutorily prescribed regulatory and inspection authorities of the department is a cornerstone of USDA operations. A quality product, competitive in every market place, is the objective of every aspect of the American food chain. USDA continues its commitment to that mission.

USDA works closely with our sister agencies in government in the delivery of a safe food supply to our consuming public. We defer to the Environmental Protection Agency for toxicology and risk assessment aspects of pesticide use and we look to the Food and Drug Administration to regulate residues in finished food products for the market place. We have initiated and subscribed to inter agency agreements to take prompt action to protect the American public whenever the circumstances have required such measures.

Moreover, it is important that adequate and factual information about foods and food products always be available to the American public. Our pride in production and our commitment to quality products is superseded by our absolute intention to have a safe food supply available to the American public.

In the specific case involving the application of daminozide, commonly called Alar, we share the conclusion of our sister agency, the EPA, that the normal and usual consumption of apples and apple products in the diet presents no risk to the consuming public.

Earlier this month, the Agricultural Marketing Service conducted a survey of all USDA suppliers of applesauce, apple juice, and apple slices. The near unanimous report from those suppliers was that apples from trees sprayed with Alar are not acceptable in the processing or distribution chain. The USDA suppliers of these products require certification from growers or handlers attesting that the product had not been treated with Alar or, in the alternative, do their own testing to assure

the quality of the product. The lone exception was a supplier which ran its own tests and reported negative results. Industry, at least those surveyed by our USDA purchasing personnel, took adequate steps to assure the safety of the apple or apple product before putting it into the hands of consumers.

The Food and Nutrition Service, another agency of USDA that administers food assistance programs, is similarly concerned about the safety of the program. AMS, following the procedures previously outlined, generally is the purchasing agent for the Food and Nutrition Service but FNS also relies on information from EPA and the FDA to assure that the apples and apple products in food assistance programs, school lunch programs, and in all Federal assistance programs are safe for human consumption.

In a recent directive to regional administrators, the FNS stated: "Apples are a nutritious food; there is no reason to stop eating apples or apple products. While the Government cannot assure that any food is absolutely free of risk, on the basis of current information we believe apples to be safe. We do advocate the removal of apples or apple products from school lunch menus."

USDA believes the current hesitation and apprehension concerning the use of apples and apple products is based on incomplete scientific evidence. A recent report of the National Research Council concluded that there is no evidence that pesticides or natural toxins in food contribute significantly to any health risk in the United States. The Human Nutrition Information Services of USDA continues to advise consumers to eat a variety of foods, in moderation, intended to maintain desirable nutritional balance in the interests of proper weight and other health considerations. They continue to include apples in their suggested market basket. USDA supports the concepts of helping Americans maximize the benefits of the food they eat and minimize the risks accompanying improper or imprudent dietary practices.

Finally we commit to you on this committee and through you to the people of this country a continuing USDA role in inspecting, in monitoring and in encouraging America's agricultural producers, processors and merchants to deliver a safe and wholesome food product to the consuming public. We believe that apples and apple products are a nutritious and vital part of the safe American diet for young and old alike.

Senator DODD. Senator Hatch.

OPENING STATEMENT OF SENATOR HATCH

Senator HATCH. Thank you, Mr. Chairman.

I am very pleased that you have scheduled this hearing today on the safety of one of our Nation's dietary staples, and that is apples. We had a lot of them in the Senate yesterday, and I think at least every Senator I knew was eating them.

I would like to submit my statement for the record, in which I believe are the important legislative changes——

Senator DODD. All statements by members will be included in the record.

Senator HATCH [continuing.] Which we have to make in order to ensure the safest possible food supply. I might mention in that regard that Senator Kennedy and I are working on legislation to ensure that we have safer pesticides based on science, and of course, this will be addressed as an important public health issue. And we want to discuss in the future all kinds of food safety issues that will be important to all of us in this country.

Now, the NRDC report has raised important issues about the current use of pesticides. Both the consumer and the producer of the foods affected need straight answers which are based on the best scientific evidence available.

The questions raised by this single report have prompted a panic, even though some very knowledgeable people have challenged the report's content and, of course, accuracy.

Commissioner Young, I am very pleased to have you here today. You are an important scientist. Your organization really does pass upon the worthiness of 25 percent of the consumer products in this country. There is really no other agency that has that kind of power or that kind of impact. So you are particularly crucial here today.

You asked for withdrawal of all Chilean fruit this past week because of concerns about its safety. This action alone, it seems to me, would certify your authority as well as your willingness to use it when the circumstances warrant it.

I am also happy to have members of Congress with us this morning and other witnesses, and one of my favorite actresses, Meryl Streep. We are happy to welcome you to the committee as well.

Commissioner Young, I would like for you to come forward for just a second. I know you are going to testify in full, but I want to give you this apple. I want to be treated a little bit better over there at FDA than we have in the past—here, I will throw it to you.

Let me ask you this. Just tell me if that apple is safe for my children and my seven grandchildren to eat.

Mr. YOUNG. Based on the best knowledge that I have been able to review in the last 3 years, the answer is yes.

Senator HATCH. And you will testify more fully on that and give us the scientific data as well.

Well, is it safe for them to drink apple juice?

Senator DODD. May I ask my colleague, why don't we try and do this in a proper way?

Senator HATCH. I will.

Senator DODD. Thank you. Are there further statements?

Senator HATCH. Let me just finish. I am really concerned whether in the panic on this thing that we are doing this Nation a great disservice. I am really concerned whether in the panic over this, we are doing children a great disservice.

I share the same concerns that our distinguished Senator from Washington has expressed here today, and I think most others will express as well. I am concerned that sometimes we get panicked over something like this when we have real food safety concerns in our society that could be resolved if we got rid of some of the literally archaic approaches that we have had toward food safety in the past. In fact, this problem would have been solved had we changed some of the rules just a few years ago that we suggested needed to be changed.

Mr. Chairman, the administration has asked me to read their official position on this particular issue. This is a statement that was issued jointly by the three Federal agencies—the Food and Drug Administration, the Environmental Protection Agency, and the U.S. Department of Agriculture:

> In the past few weeks, there has been a growing public controversy over the potential harmful effects of a chemical called "Alar", which is used by apple growers to retain the crispness of their fruit as it goes to market. It is used primarily in the growing of Delicious, Stayman, and McIntosh apples.
>
> The Federal Government believes that it is safe for Americans to eat apples, and the responsible Federal agencies are working together to reassure the public of this fact.

Recently, the Natural Resources Defense Council, NRDC, has claimed that children face a massive public health problem from pesticide residues in food. Data used by NRDC which claims cancer risks from Alar are 100 times higher than the Environmental Protection Agency estimates were rejected in 1985 by an independent scientific advisory board created by Congress.

Alar has been used for decades in apple growing and has been the subject of many possible studies on possible harmful side effects."

A recent project report on preliminary results from an ongoing study shows that a breakdown product of Alar caused certain kinds of tumors in mice. Based on this report, EPA has begun the process to phase out Alar in apple growing if the final data, which will be independently reviewed, demonstrate a need for cancellation. Cancellation could then occur by July of 1990.

EPA believes the potential risk from Alar is not of sufficient certainty and magnitude to require immediate suspension of the use of this chemical. EPA and others have pointed to lack of scientific validity in the suggestion by the NRDC that the risk is much greater than has been stated by EPA. The Food and Drug Administration of the Department of Health and Human Services, the agency responsible for monitoring pesticide residues in food, has found either no residues or residues that are far below EPA's tolerance.

Both FDA and EPA believe that Alar used over this interim period is safe and does not pose a health risk to the American public. Available data show overwhelmingly that apples carry very small amounts of Alar. In addition, its use has increased dramatically over the past several years. Estimates are that 95 percent of the apple crop was not treated in 1988.

It should also be noted that risk estimates for Alar and other pesticides based on animal testing are rough and are not precise predictions of human disease. Because of conservative assumptions used by EPA, actual risk may be lower or even zero.

The FDA, EPA, and the U.S. Department of Agriculture believe there is not an imminent hazard posed to children in the consumption of apples at this time despite claims to the contrary.

Therefore, the Federal Government encourages school systems and others responsible for the diets of children to continue to serve apples and other nutritious fruit to American children.

This is an issue that will continue to be monitored closely by the responsible Federal agencies that have acted in the past to cancel pesticide uses which pose a cancer risk.

With that, that is the official position of the administration at this time. I just want to welcome everybody here, and tell you this is an important hearing, and go on from there.

I would also like to submit a prepared statement by Senator Kassebaum.

[The prepared statement of Senator Kassebaum follows:]

PREPARED STATEMENT OF SENATOR KASSEBAUM

Senator KASSEBAUM. We are never so vulnerable as when our children are threatened. As the mother of four children, I sympathize with those parents who have responded with fear and concern to recent reports about the effects of pesticide residues on young children. These are parents who have made special efforts to see that their children's diets are full of healthy foods. Now they are told that their good intentions may have harmful effects.

I appreciate Chairman Dodd's willingness to examine these concerns carefully and in depth. Certainly, if changes need to be made in the methods we use to assess risk posed by pesticides in the diet of infants and children, we need to make those changes. I know that the Environmental Protection Agency and the National Academy of Sciences have expressed their willingness to cooperate. The important thing is that we base our actions on the facts and on the best methodology science has to offer.

Wendell Wilkie once observed that "a good catchword can obscure analysis for 50 years." I hope we will avoid catchwords today. Recent coverage of pesticide residues has spread alarm among parents and schools, eroded confidence in our regulatory safeguards, and could ultimate threaten the livelihood of those farmers who make our food supply the most abundant and affordable in the world. I hope that today's more thoughtful, responsible approach will ease all of these concerns.

Senator DODD. I thank the Senator from Utah.

I noted this morning in an article in *U.S.A. Today* that the President drinks carrot juice. He says he does not eat apples with that "stuff" on them, was the quote.

Senator Thurmond.

OPENING STATEMENT OF SENATOR THURMOND

Senator THURMOND. Thank you very much.

Mr. Chairman, I have a little laryngitis, and I am going to say just a word.

Apples are nutritious, and they are delicious. I think the EPA must take every step possible to see that the pesticides, insecticides and fungicides they use will not cause cancer. There is a big responsibility in this question.

I have felt for many years that a lot of the preservatives used in food are causing cancer. That has to be looked into. There is something causing a lot of cancer that we did not have years ago. I think the spray material and the preservatives must be carefully examined.

In all fairness to the apple growers, though, we should be sure before we say we cannot sell the apples, because apples constitute a good food. But steps must be taken by our health experts to protect the American people.

Thank you.

Senator DODD. Thank you very much, Senator Thurmond.

We will begin now with our panel of three witnesses. Senator Lieberman, my colleague from Connecticut, is here as well, and Joe, when we conclude with the panel, if you have any comments you would like to make, we will turn to you at that time.

Senator John Warner of Virginia, Senator Steve Symms of Idaho and Congressman Sikorski, we are delighted that you are with us this morning. Your statements will be made a part of the record.

We will start with you, John. Please proceed.

STATEMENTS OF HON. JOHN W. WARNER, A U.S. SENATOR FROM THE STATE OF VIRGINIA; HON. STEVE SYMMS, A U.S. SENATOR FROM THE STATE OF IDAHO, AND HON. GERRY SIKORSKI, A MEMBER OF CONGRESS FROM THE STATE OF MINNESOTA

Senator WARNER. Thank you, Mr. Chairman, distinguished ranking member, and members of the committee.

I shall be very brief, but I am pleased to join you this morning from two perspectives. First, as a member of the Senate Committee on the Environment, I have been working with Senator Lieberman and others on our subcommittee, conducting a very broad review of all the pesticides and other chemicals that are applied to our food

products. But I would urge this committee, as I have urged my committee, to exercise some crisis control. Indeed, that is the situation we are faced with, what appears to be a crisis, but in fact I am confident that we can work our way through this as responsible legislators in such a way as not to undermine the public confidence in those departments and agencies of the Federal Government that have been entrusted by the Congress with the responsibility of making the appropriate tests and also appropriately advising the American public on how to deal with these food products.

I think this is a very responsible step forward here, as indicated by Senator Hatch today, the joint announcement of three of our Federal departments.

But now I would like to speak from the perspective of one who has owned an orchard for a quarter-century, a small one nestled in a valley of Virginia. And I might add, many Virginians have come forward this morning to be present at this important hearing.

First, I would want to say that the apple industry is strong in some respect, but fragile in others. It is strong because only strong-hearted men and women will undertake the enormity of the work to produce an apple. It requires tender care of the trees; every month of the year, something has to be done to that tree. If the trees are abandoned just for a short period of time, it is very difficult if not impossible to return them to productive use.

The profit margins are very fragile in this industry, and therefore a crisis of this nature could well force stout-hearted people out of the business or make it impossible for them to care for these orchards, which require almost daily supervision.

Therefore, I hope that the Congress proceeds in a careful way, working in coordination with the responsible Government agencies and with those experts who can bring to bear a knowledge on this issue.

I would like to also contribute, as the distinguished chairman did this morning, reading a little bit. I found an old cookbook that has been around in families a lot longer than I have, and it says, in a wonderful little paragraph dealing with applies, and I quote: "It is the children's fruit, beloved of small boys for generations, cherished in the school bags of little girls with an eye on recess, when it could be shared with the intimate friend or given over to a beloved teacher. Always, it has been their first choice, their favorite, and for good reason. It puts sparkle in their eyes, polish in their teeth, joy in their stomachs, and health overall."

Now, Mr. Chairman, it would be my hope that we can indeed, in every respect, protect our younger generations, but let us do so in a manner in which we are fair and equitable to all involved in this crisis of the moment. I hope it will soon pass and that we will find the solution.

I thank the chair.

Senator DODD. I thank the Senator from Virginia, and of course, that is the purpose of this hearing here this morning.

Senator Symms.

Senator SYMMS. Mr. Chairman, I thank you and the members of the committee very much to testify this morning, and I understand my entire statement will be in the record, and I will summarize my statement in a much briefer message.

I just want to set the record straight for members of the committee. I think it is well-known in the Senate that my background is agriculture. In fact, someone told me that I was the only member of the U.S. Senate who actually majored in horticulture in college——

Senator THURMOND. Mr. Chairman, I will have to correct that; I did the same thing. [Laughter.]

Senator SYMMS. Senator Thurmond is a man of all seasons; there is no question about that. And I am sure he has eaten many apples, and that is why he is so healthy at this age.

But I wanted to say also, for my dear friend the chairman, who has been a friend of mine for many years both in the House and here in the Senate, that in fact I knew the chairman when he had hair that was darker than mine. And the apples that my family's orchard sent to the Democratic Cloakroom yesterday—they also sent a box to the Republican Cloakroom—so there was no——

Senator DODD. I was curious as to whether or not that was the case.

Senator SYMMS. I had some of my colleagues ask me that. But I am a third-generation apple grower, and my son is active in our family business right now, so I have a great interest in the industry, as all the Senators know, and my State also is deeply involved in the production of many fresh fruits and vegetables.

I just want to get into addressing the role that modern chemical technology plays in producing fruits and vegetables that are essential to the health and the security of the Nation.

Idaho produces, of course, a large percentage of the Nation's potato crop and is very famous for the Idaho russet potato. But we also produce about 12 percent of the Nation's plums and prunes, 6 percent of the sweet corn for processing, about 140 million pounds of apples, 2.1 million pounds of sweet cherries, and lots of peaches and other fresh fruit and vegetable crops.

But I want to get on the record first that I totally understand the concerns of the American people and the concerns that will be expressed here this morning. And I want it known that I put the lives of the children of this country ahead of the interests of industry. But I do think that the lives of children and that of industry are probably on a parallel track, because the industry people also have children and grandchildren, and I was thinking, Senator, when you mentioned you had four children and three grandchildren, I am in the same situation as that. I also am a great admirer, as is Senator Hatch, of Meryl Streep. I certainly enjoyed her movie, "Out of Africa", and I hope that she can recognize from that role the plight of the plantation owner is not that unlike that of the apple producer or other produce, in many cases.

So I do have a sympathy and a concern with people who concerned, and naturally, we are all concerned about what it is we are feeding our children, who are our most precious resource.

But I think we need to get into fruits and vegetables in our diets and the role that they play. The principal reason why we have an agriculture chemical technology is to make an abundant supply of fresh fruits and vegetables possible. The benefit of having such foods in our diet cannot be disputed.

The Natural Resources Defense Council of the National Academy of Sciences has just completed the most detailed and comprehensive review of dietary issues in the United States. This 14,000-page report makes a strong case for the continued consumption of fruits and vegetables. The report's authors conclude that not only does a fruit and vegetable-rich diet help prevent cancer; diets that are low in such foods may actually contribute to cancer and chronic disease. The authors of the report were not ignorant of the claims about pesticide residues on fruits and vegetables. In fact, the report notes that the very studies that have recently been used in media campaigns against agriculture chemicals, obviously, the Natural Resources Defense Council felt that the volume of evidence in support of fruits and vegetable outweighed claims about pesticide residues.

I might just show you, Mr. Chairman, that this beautiful apple happened to be one that came in one of the boxes yesterday that had been sent. This one was not treated with Alar. So you can see that you can grow good apples without Alar. In fact, I had discussed this issue with Lee Thomas, with Jack Moore of EPA and with Bill Reilly of EPA earlier this year and last year and urged them, because of the potential for a national scare that might take place, that if there is any question about it, to remove Alar from the market, but to not do it in the middle of the marketing season.

Unfortunately, my fears were brought to the worst bearing. I think if you look at the record, you will see that in the State of Washington, there are probably somewhere between 20 and 30 million boxes of apples yet unmarketed, with most of them—probably only a small percentage of them—having any Alar on them. So those people are being hurt in this process also, because the apple market is dead as a door-nail right now across America.

So you can grow an apple like this without the product, so it is not that we cannot get by without it. And even if it had been treated with this, I might say, Mr. Chairman, you would have to eat 28,000 pounds a day for 70 years to get as much as the mouse got. Most of us cannot quite do that.

But some national environmental groups have argued that it is possible to produce an abundant supply of fruits and vegetables without using unnatural chemicals. Even though you could get by without Alar, that argument shows a clear misunderstanding of what farm chemicals are and why they are used.

Nature herself makes more pesticides and herbicides than we do. Consider, for example, the tropical leafcutter ant, who produces in its body a very potent fungicide. The ants harvest and store a compost of finely-chopped leaves, which they coat with this chemical. The fungicide is a deadly poison, killing every species of fungus known but one. This one surviving fungus just happens to be the food of preference for the colony.

So the point is that if an ant can do that, human beings have been able to do it; that is basically what farmers do when they spray their fields and crops. They are just using their native human intelligence to increase and improve our food supply.

I would say, Mr. Chairman—and I would challenge those—that I believe the American people have access to the best, cleanest, healthiest supplies and sources of food of any other peoples on the

face of the earth. Plants make so many natural pesticides that noted cancer researcher Dr. Bruce Ames has asserted that no human diet can be entirely free of mutagens or agents that can be carcinogenic in rodent systems. We are ingesting in our diets at least 10,000 times more by weight of natural pesticides than man-made pesticide residues.

According to Dr. Ames' research, some of our most common foods are chockful of chemicals that cause cancer in laboratory animals. Chart A shows a variety of carcinogens found naturally in food—a couple slices of bread, a mushroom in your salad, a half can of shrimp, all contain chemicals shown in the laboratory experiments to be potent carcinogens in rats or in mice. The EPA risk assessment, the Food and Drug Administration, and the Environmental Protection Agency are charged with protecting our food supply so that farm chemicals do not threaten public health. In order to know what to regulate, these agencies must assess the risks posed by various chemicals.

But the unknowns about cancer are so numerous that this assessment process is filled with what I would call a little-less-than-educated guesses.

To assure the final risk is not understood, the agency usually guesses in favor of an assumption of a higher risk. Chart B shows some of the guesses that EPA must make. I just want to say first, if you want to take a look there, the Alar exposure—if an infant got the maximum of an Alar exposure, the risk assessment for chance to increase their risk of cancer would be somewhere between eating a peanut butter sandwich and on diagnostic x-ray in a lifetime. So it is a minimal number at the outset.

Chart B shows some of the guesses that the EPA must make about cancer-causing mechanisms which serve to inflate the final estimate of the risk. As shown, an EPA cancer risk assessment can overstate real risks by anywhere from 15 to 10,800 times.

Most recently, there has been a lot of discussion about risk to children posed by the growth regulator, Alar—daminozide, or Alar by its trade name. I already mentioned that I had urged the EPA to try to avoid having this situation happen, which I think has been unfortunate, it has been tragic, it has caused a great deal of fear that could have been avoided. And I might say to Lee Thomas, Jack Moore, and Bill Reilly that the answer that I was always given is that EPA does not have the authority to remove anything from the market that presents no risk to the health and safety of people.

At the time, I told them the problem is that there are a lot of people whose health and safety will be at risk if they are caught with large storehouses full of apples that people decide, for some reason, right or wrong, are not good for them to eat.

So I would like to put those claims into perspective. Tossing out the pseudo-science that some claims have relied on, the evidence is mixed at best. With half a dozen Alar studies showing negative cancer-causing properties and a smaller number indicating some tumor increases at high dosages, the EPA has attempted to put together a tenuous risk assessment. At this stage, EPA's best guess is that Alar probably does not pose a threat of cancer to the average

individual more than .96 in one million over the next 1.5 years, after which EPA intends to take the product off the market.

Chart C shows how this risk compares with a number of other typical risks that we face in life. The individual risk from Alar is a little less than the lifetime risk of cancer caused by one flight across the Atlantic. Even looking at the risk to non-nursing infants, the EPA's theoretical best guess is that the risk to the infant is not much more than the risk posed by one diagnostic x-ray in a lifetime. It is not as risky as peanut butter sandwiches or walking on the sidewalk.

Remember, this is EPA's theoretical risk, and it can overstate the real risk by 15 to 10,000 times. Our Government regulators do not think this risk warrants the national panic seen in the last 2 weeks. A recent memo to regional administrators of the Food and Nutrition Service states that "based on the best information available to FDA and EPA, apples are a nutritious food, and there is no reason to stop eating them, and we do not advocate the removal of apples or apple products from school lunch menus."

Senator Adams has already asked that that be made a part of the record, and I would just call my colleagues' attention to that. But I also want to remind my colleagues that this analysis of risks posed by Alar is from the same individual who found cyanide in two grapes sufficient grounds to block shipments of fruit from Chile and to advise every American to clean fruit of unknown origin out of their refrigerators.

Now, could our Federal regulators be wrong? Is the risk too much, and can it be avoided? That is really the question that I think this committee has to pursue this morning. You cannot hastily answer such a question, and I admire you and the committee, Mr. Chairman, for digging into this issue. We choose to live in homes subjecting ourselves to the risk of fire in order to be comfortable, warm, and away from the elements that may pose greater risks. But the risk is balanced by benefits.

Our current statute regulating pesticides and agriculture chemicals appropriately weighs the benefits of chemicals against their risk. And when I say benefits, I mean more than economics. Pests and pest-borne diseases account for 100 to 300 deaths annually, probably 20 times this number of serious disabling injuries and illnesses, plus several million episodes of illness or injury that are serious enough or painful enough to require medical attention.

Our modern chemical technology to control these pests saves thousands of lives and prevents the suffering of millions of people because we are able to produce so much. Such powerful benefits cannot easily be tossed aside when compared with the minute theoretical risks that emerge from our ignorance about cancer and its mechanisms.

So in conclusion, Mr. Chairman, I am gravely concerned that the efforts of certain individuals and organizations to promote an image about agriculture chemicals that is neither accurate nor productive is a distortion, and it has been especially pronounced in the rhetoric over Alar.

I, for one, am glad to see that credible authorities across the country are stepping forward to debunk these claims. It is one thing to create a crisis without cause; it is quite another to adver-

tise this crisis across the Nation, setting in motion events that clearly could have the opposite effect intended to jeopardize the health and safety of Americans.

Even the economic losses involved are not without cost to public health. Alar is estimated to yield an economic benefit of $200 million. How many lives can be saved at that price? How many children could be fed, clothed, and given proper health care for that amount of money? What about the farmers, many of whom never use Alar, whose livelihoods are now in jeopardy? Did anyone do a risk assessment on the stress that has been put into the lives of those people? Did anyone check to see what might be the trade-offs for removing Alar from use? Could lower-quality apples increase the amount of mold and fungus that makes its way into apple juice? Did anyone check the cancers that would be caused by aflatoxins in that case?

Consider how school districts have reacted. How many thousands of children have had apples removed from their diets? And now, because of the Chilean crisis, fresh fruit supplies are short in general. The National Academy of Sciences was more sure that low intake of fresh fruit and vegetable can contribute to cancer than it was that Alar can. In other words, without eating fresh fruits and vegetables, I think we know that colon cancers are more prevalent in people who do not consume more fresh fruits and vegetables. It is conceivable that this paranoia itself, when multiplied by millions of individuals, could result in the statistical number of cancers. How many? Hundreds? Tens? Did anyone find out?

I hope, Mr. Chairman, that we will emerge from this debate with some valuable experience. We have seen individuals take upon themselves the awesome responsibility of choosing which risks a Nation will face and which it will not. These individuals must now accept the burden of deaths caused by their choice as well as any lives that might be saved.

Now, I say again, Mr. Chairman, I would invite you to join me in eating apples. Twenty-eight thousand pounds of apples a day are not likely in most people's diets. One or two a day, we highly recommend for the betterment of health and human services.

I thank you very much for the opportunity to be here. I look forward to working with this committee as they can help to shed more light and more truth on this issue.

Just in closing, I want to say that as a general statement, the United States fresh fruit and vegetable industry and the related industries of the wholesale grocers and the retail grocers have done a marvelous job to provide through the free enterprise system the best fresh fruit and produce that any people on the earth have had the privilege of enjoying.

I thank you very much. Join me in eating an apple.

Senator DODD. Thank you, Senator.

Congressman Sikorski, we welcome you.

Mr. SIKORSKI. Thank you, Mr. Chairman and members of the committee, for the opportunity to be here.

I want to commend all of you for your leadership and concern on this issue.

I will summarize my points. I do not know about you, but I am here for Meryl Streep, so I will try and hit a few points.

I'm not a scientist or researcher, a medical doctor or oncologist, a biologist or horticulturist. I am a father—a concerned, scared and more than a little angry father.

Like most of my generation, I have been raised with certain embroidery-like, life-living principles drawn from Dr. Spock, Euell Gibbons, "I Love Lucy", and Captain Kangaroo:

Fruits and vegetables are healthy.

An apple a day keeps the doctor away.

Complex carbohydrates build strong bodies and provide ready energy for active kids.

Fiber is "the right thing to do."

The Government is looking out for the American food supply.

The Environmental Protection Agency is just that.

The Food and Drug Administration is testing and guarding our food supply.

Chemical companies wouldn't market anything dangerous; and apple producers and baby food companies really care about these things.

And the wicked stepmother was simply offering Snow White an EPA-approved, FDA-tested, healthy, happy, fiber-rich apple.

No one told me that a chemical compound used also as a rocket fuel additive, and found to cause tumors in laboratory animals in four of four independent studies was being sprayed on the apple trees my daughter was fed from; that this toxin went to the heart of the apple, and couldn't be washed, scrubbed or peeled off; that it broke down in cooking or processing into UDMH—what the scientists, doctors, researchers and the EPA call a potent, dangerous carcinogen—even more dangerous than raw daminozide—and that kids, because of their less-developed enzyme systems to get these things out, their less-developed immunological systems to fight them inside the body, are particularly vulnerable.

I'm concerned, scared and mad because all the time that I've been feeding my daughter food that I thought was good for her, I may have been increasing her risk of cancer. The first solid food we fed her was applesauce, and I've put more apple juice in her than gas in a race car. And I'm not alone.

Anyone who reads the paper or watches the news or sends their kids to school knows that this committee room is the eye of a hurricane of public concern and anxiety:

The FDA, EPA, public officials, grocery manufacturers and baby food makers, are all receiving thousands of calls a day.

Frightened consumers in New York are boycotting apples and apple products.

School districts from Los Angeles to New York, from San Francisco to Chicago, from Atlanta to Minneapolis/St. Paul, have stopped serving apples and apple products to their students; even more are considering doing so.

The public uproar that everyone is talking about is nothing more, but nothing less, than the outcry of concerned parents across America, teed off at the failure of a system we depended on to protect our children. It's a case of the public now doing the job the Federal Government, the chemical manufacturer, and the growers

should have been doing—if they hadn't been seduced by the fine needlepoint that hung in the Reagan government right next to "Home Sweet Home" has been an embroidery of "Get the Government off our backs"—even at the cost of more carcinogens in our kids' bloodstream.

Well, the public is banning Alar, and a lot of non-Alared apples, delicious, nutritious apples, are bobbing down with the bad products.

The case of Alar is more than this week's assignment in How Not To Regulate Pesticides 101. It is a chilling demonstration of what is wrong with our whole system of pesticide regulation—and what we must do to remedy it. It is a story of failures and of successes.

This is partly a story of the EPA's failure.

It's not that the EPA hasn't had the tools or the mandate to ban carcinogens in our food supply. Protecting human health and the environment has been its charge from Congress all along.

Go back to the Delaney Clause of the Food, Drug, and Cosmetic Act of 1954: No carcinogens in food. Period. This proscription covers food additives including any pesticide that would show up as carcinogenic in processed food.

You want to know the record of our regulators? Look at how many times the Delaney clause has been applied to take a carcinogen off the market since 1954: Zero.

And it's not that there haven't been carcinogens on our food: A 1987 EPA study entitled "Unfinished Business," ranked pesticides as one of the Nation's most serious environmental problems. To date, EPA has identified 66 pesticides (which leave residues on food) as carcinogenic. Others are suspected of causing birth defects or miscarriages. Some can produce genetic mutations that are to be passed to the next generation. And still others can cause infertility.

Because of these risks from pesticides, the EPA won't even register new pesticides—let alone allow them to be marketed—until the producer tests them for potential to cause: Cancer, infertility, sterility, birth defects, nerve damage, genetic mutations, and chronic diseases.

So why hasn't the EPA done anything about the carcinogenic, teratogenic, and mutanogenic pesticides that are commonly sprayed on foods? Because until the major pesticide regulating bill—the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA)—was rewritten in 1972, it wasn't even conceived of as an environmental protection law. And because every pesticide on the market prior to 1972 was given blanket approval, even though almost all of them had never undergone modern testing for serious health effects.

In 1972 Congress required the EPA to go back and test these "grandfathered" pesticides—and "reregister" them only if they proved safe after comprehensive testing. Unfortunately, since then EPA has completed safety reassessments on only 2 of the 390 grandfathered pesticides, the remaining 99 percent have never undergone a complete safety review.

Altogether, 600-plus active pesticide ingredients, many untested by modern methods, are contained in some 400 pesticides registered

for use on food. Thus, the EPA is regulating pesticides out of ignorance rather than knowledge.

Alar, or daminozide, is a particularly egregious example.

Alar is the market name for daminozide, first introduced in 1963. As such, it is one of the pre-1972 "grandfathered" pesticides that have never undergone complete safety reviews by the EPA.

Despite the EPA's lack of attention, we've known about the hazardous potential of daminozide for quite some time. Independent studies stretching back over 15 years, have confirmed the carcinogenic nature of daminozide and its metabolite UDMH:

1973—Toth Study (University of Nebraska, Eppley Cancer Institute):

Independent study concluded UDMH is carcinogenic. Administration of drinking water containing UDMH resulted in a statistically significant increase in the incidence of blood vessel tumors and lung tumors in both male and female mice. Formation of kidney and liver tumors were also noted in this study. Administration of drinking water with daminozide resulted in a statistically significant increase in the incidence of blood vessel tumors (a rare site for tumor formation) and lung tumors were formed in both male and female mice, as well as an increase in the incidence of kidney and liver tumors in the male mice.

1977—Toth Study (University of Nebraska):

Independent study found UDMH carcinogenic. Colon tumors resulted from the administration of UDMH in drinking water of hamsters.

1978—National Cancer Institute:

Independent study concluded daminozide is carcinogenic. The administration of daminozide in feed caused adenocarcinomas and leiomyosarcomas of the uterus of female rats (rare sites for tumor formation); heptocellular carcinomas were formed in male mice and alveolar/bronchial carcinomas and adenomas were formed in male and female mice and female rats.

As a result of the cumulative conclusions of these independent studies, the EPA in 1985 publicly announced it was banning daminozide. It even published a notice of proposed rule making in the *Federal Register.*

Upon review, the EPA's Scientific Advisory Panel concluded: "The Agency (EPA) has determined that structure activity considerations strongly support the conclusion that daminozide and/or its metabolite, UDMH, have oncogenic properties." The panel upbraided the EPA for not acting on this evidence: It could not understand why, given the multiple evidence of potential oncogenicity that had been available for eight years, EPA had not "requested, nor the registrant initiated in a more timely fashion, additional oncogenicity tests."

Thus, ignorance is bliss. The data was insufficient to conduct qualitative risk assessment and Alar was not removed from the market. Over a decade after studies showed cancer, the EPA requested two more studies on daminozide (one on rats and one on mice) and three studies on UDMH. The EPA used the Advisory

Panel's report as a crutch to keep the progressively disabled daminozide on the market.

Allowing a grandfathered pesticide that walks like a carcinogen and quacks like a carcinogen to remain on the market and be consumed in large quantities by tiny kids is wrong. We are starting to see just how wrong from the first results of these new studies. Conducted by the sole manufacturer of the pesticide daminozide, Uniroyal, the current tests have—after 3 long years of additional exposure and God knows how many additional cancer cases—given EPA sufficient spine to cancellation procedures for daminozide.

The EPA voices born again concern:

"There is an inescapable and direct correlation between exposure to UDMH and the development of life-threatening tumors in test mice."

The carcinogenicity of both daminozide, and its metabolite, UDMH, have never been credibly refuted. The evidence of carcinogenicity has been around for over a decade and a half. But those with an economic stake in the poison have played the Reagan EPA and FDA like a fiddle, putting on American parents the burden of banning what the EPA says it wouldn't allow on the market today.

The Alar case also illustrates the failure of the FDA to monitor and enforce the minimal pesticide protections on the books.

Of all the shipments of food in the United States today, the FDA tests a sample of less than one percent—and knowingly misses half of the high risk pesticides.

The FDA currently does not even have the capability to routinely test for daminozide or UDMH, because it has not made the development of cost-effective measures to detect these chemicals a priority—for itself or those making big money from its sale and use.

Of the millions of apples and apple products grown and consumed in the United States in the last 2 years, the FDA tested only 11 for daminozide each year, and only one sample of apple juice over the 2 years. Of all the products on the market that might contain the more potent daminozide metabolite and carcinogen, UDMH, the FDA in 1987 or 1988 tested not a single apple or juice or sauce. For the FDA's political appointees—who have overseen the loss of some 1,500 inspectors in the last 8 years—to now come before the American people and claim to know what's happening and tell us everything is fine, is insulting. Parking a statue of the three monkeys—"Hear no evil, See no evil, and Speak no evil" up here would be more honest.

The FDA's chronic lack of resources is particularly crippling to ensuring the safety of imported produce, which is twice as likely as domestic produce to contain pesticide residue. Laredo, TX is an entry point for much of our Nation's produce. I visited that border crossing with 60 Minutes and heard tell of a sole FDA inspector charged with inspecting the tons and tons of produce entering the United States at 4 separate points over 400 miles of borders. Of an average 1,800 shipments per day, maybe 4, maybe 10 samples were taken and tested.

Fortunately, into the void of Federal testing, and enforcement, and commitment, stepped some heroes.

I commend the Natural Resources Defense Council for their commitment and patience in devoting 2 years to the most comprehensive study of the health effects of 23 of the most suspect pesticides on the market—with a unique focus on the particular sensitivities and vulnerabilities of children to pesticides.

For years the Natural Resources Defense Council has been on the front lines as a much needed advocate for the public interest. For protecting our most precious national resource—our children—I thank them. And for a body of work that has been of tremendous value to the public interest I applaud them.

I commend also Meryl Streep, for her good efforts and hard work to increase public awareness about the dangers of pesticide residues in our food. Her involvement has been and will continue to be invaluable in focusing public attention on this silent and pervasive threat to the public health, most particularly, the health of our children.

Ms. Streep has chosen to use her celebrity status to raise this issue in the public consciousness. In the process, she has become an easy target for those whose economic concerns extend beyond the realm of public health.

She could easily have chosen a tried and true, safe and secure cause, but she has chosen an issue that affects the health of her children and all America's kids. I wish her every success with her joint organization with the American College of Pediatrics: "Mothers and Others for Pesticide Limits."

And God bless the parents of America. Because of the lack of regulation from those who are charged with doing so (and paid by the taxpayers for doing so), and because of the lack of self-regulation from those who place these toxics on the market and use them in the food chain, the parents of America have sprung into action through "grassroots regulation":

They've barraged the EPA who just tell them to call the FDA who tell them "Don't worry be happy."

They've pressed supermarkets to post signs that the apples they sell are daminozide-free, and asked baby food manufacturers and apple juice producers to certify that their products are daminozide and UDMH free.

They've demanded information, and the Produce Manufacturers Association now has a special toll-free hot line for its retailers to answer questions about pesticide residues in foods.

Today, EPA and FDA should use their existing authority to ban Alar and order it immediately removed from the market.

I have sent a letter to William Reilly, acting administrator of the EPA, along with a number of my colleagues, urging him to expeditiously invoke his authority to pull this pesticide off the market. And, in case the EPA doesn't promptly respond, I am introducing legislation today that will mandate EPA action.

Today we'll hear from the regulatory proponents of doing nothing their day before St. Patrick's Day version of the blessing: "May the wind be at your back, the sun shine warm on your face, and the road rise up to meet you," a kind of public relations.

And the commercial proponents of Alar are using their own P.R. in their million dollar ad campaign, but they don't tell us where their figures come from, and they miss some important facts:

They ignore the fact that our children are much more susceptible to toxic chemicals than adults;

They ignore the fact that children don't have the same developed systems to move these toxics out and are left with an undeveloped immunological system to fight these toxics off;

They ignore the fact that children have a different growth pattern than adults;

And they ignore the fact that a typical preschool child consumes 6 times as much fruit as an average adult, and 18 times as much apple juice; and that the fruit and apple juice consumed is many more times the proportion of total food intake.

They ignore it, and the EPA ignores it, because for the past 35 years, tolerance levels for pesticides on food have been set not for the most vulnerable segments of our population, but for the average diet and tolerance of an 18-year-old male. That standard is completely irrelevant to the safety of my 8-year-old daughter.

Each of us must work to ensure the safety of our food supply:

First, manufacturers must ensure that the products they put on the market are safe—before they go on the market. They must take responsibility to remove products from the market that prove hazardous.

Second, growers must act prudently and expeditiously to remove products that may be hazardous—despite inflated economic consequences. Growers must insist that the burden of proof reside with manufacturers to ensure that products are safe.

Third, the EPA should rapidly establish new, protective tolerances for the 23 pesticides that are the subject of the NRDC's study, and it should expeditiously complete the review of the 600-some active pesticide ingredients on the market.

Fourth, the FDA should enforce the current and better EPA standards. FDA must be able to recognize and respond to a potential threat to our food supply. Just 2 days ago FDA demonstrated it has the ability to act in the acute hazard case of Chilean grapes, but it has dragged its feet on responding to the long-term cancer, mutation and birth defect threats from pesticide residues.

Fifth, Congress should require the EPA to regulate pesticides on a health based, rather than an economic based standard. Instead of juggling economics and balancing accounts, the EPA should base the standard for pesticides on a simple principle: What a parent would consider healthy for his or her child.

Congress should give the FDA the resources it needs to test and monitor a representative percentage of our foods, both imported and domestic, and patrol our borders, to ensure that the standard we set are followed.

Finally, and most importantly, parents can keep informed, keep the pressure on all of us to do our job, and above all, keep their children healthy.

Thomas Jefferson said: "I know no safe depository of the ultimate powers of society but the people themselves." I agree.

Thank you, Mr. Chairman.

Senator DODD. Thank you very much, Congressman, for being here this morning. We appreciate it.

Our first panel is Dr. Frank Young, the administrator of the Food and Drug Administration; Dr. John Moore, acting deputy administrator of the Environmental Protection Agency, and Dr. Deborah Prothrow-Stith, commissioner of the Massachusetts Department of Public Health.

We appreciate all three of you being here this morning. I will first of all tell you that your prepared statements will be included as part of the record and would urge you for the sake of time here this morning that you try and paraphrase your statements and keep them brief.

I have not turned on a time clock, but I am going to have to watch it so that we don't let this go on inordinately long.

We will begin in the order that I have introduced you.

Dr. Young.

STATEMENTS OF DR. FRANK E. YOUNG, ADMINISTRATOR, U.S. FOOD AND DRUG ADMINISTRATION; DR. JOHN A. MOORE, ACTING DEPUTY ADMINISTRATOR, U.S. ENVIRONMENTAL PROTECTION AGENCY; AND DR. DEBORAH PROTHROW-STITH, COMMISSIONER, MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

Dr. YOUNG. Thank you very much, Mr. Chairman.

I congratulate you and the Members of the Senate for having this hearing. It is extraordinarily important that this question receive a free and forthright examination in view of the panic that has been set forward on this particular food.

I am no stranger to dealing with complicated and controversial issues. I am pleased that you will introduce the statement into the record, and I would like to make four fundamental points for you.

The first is that we face risks throughout our lives, and I am particularly pleased that both the administration and the Congress are facing very acute risk squarely—problems such as drug abuse, AIDS and others that are significant public health issues.

But life is not risk-free. And therefore we enter into, as my second point, risk assessment, and we divide it, gentlemen, into two basic categories—those that are acute or imminent hazards and those that are chronic where we can have more leisure to examine these.

I am particularly pleased in my department that our new secretary, Dr. Sullivan, has consistently stated to me and to others that our decisions should be made on the best possible science.

When we deal with this, then, we have a risk assessment approach. You have heard today some difficult jargon in regards to how to do risk assessments. I will only say one thing. It is difficult in chronic risks to develop accurate risk assessments. In the case of pesticides, EPA is charged with that risk. I have examined their risk assessment, but more importantly, I have asked our scientists to do so. And we concluded, after looking at the data, that there is not a significant risk at this time facing the American people in the consumption of apples. If there were, I would use just the same

pronouncement authority that I have used recently on the acute risk of Chilean fruit.

The FDA has, through its advice to consumers, a powerful message that it can communicate. I think one must look very, very carefully at an orderly scientific process. If this is not followed, we will be tossed in the wind as rudderless boats. Therefore, I believe EPA has faced the issue by looking at and trying to identify data in experimental animals and then doing an orderly process to analyze it.

Unless this process is allowed to complete, we will be dealing with half-analyzed truth. You have seen me on a number of occasions speak on drugs—medicinal drugs—where some individuals have said, wow, that drug looks good, only to find later that it had no effect at all. The process must be able to be done. Unfortunately, some of these processes take a long time, and that is why we are here. But I would submit for the record that during this 18-month period of time, we support EPA in focusing on this.

My final point is that I believe that the Nation can be confused easily by incomplete analyses of difficult issues. The best decision has to be made, and when those decisions are made, we have to really be able to have the evidence to deal with it.

Now, FDA's specific job is getting that evidence. And as I have said in my testimony, when we have examined the apples, and when we have looked at the unsymmetrical dimethyl hydrazine, that in looking at both of these, in the case of Alar, we have found that only 10 percent of all of the products have any trace that we have looked at. And this has decreased since the early Eighties at 40 percent. Therefore, I would associate myself with the comments made that the use is decreasing.

Second, when we look at apples and apple products, we have found that 50 percent were not containing any detectable Alar above the background level of our test, 0.1 part per million. In the other 50 percent, it usually does not even come close to one-tenth of the tolerance that is set by EPA.

Now, the very question of the tolerance is being examined now, and I cannot speak to that more than my general comments. But we have to look at the facts as they are today. Fifty percent of the products have no Alar, and of the 50 percent that do, only one-tenth of the level is usually found.

I will submit for the record what we have done on unsymmetrical UDMH. In that case, when we looked at the compound, we found very low amounts. We have no tolerance for that compound, but we are looking for the parts per billion.

I would say in conclusion, Senators, that this needs to be looked at in a very, very careful and slow fashion. At this point, there is no imminent hazard, and we can deal with that. I also support the concept that there are naturally-occurring carcinogens that are within our environment, and we need to recognize that.

But it is unfair and a joke on the part of the American people that charges are made that agencies don't do their job, and they are not provided the resources to do it. I think that has to be laid squarely on the table. And thus we at FDA continue to feel that our responsibility is to test, to analyze, and we have done so and will do so. And if you have seen my action recently, if there is a

problem, FDA will squarely address it; if there is not a problem, FDA will squarely say that there is not one.

Thank you, Mr. Chairman.

Senator DODD. Thank you very much.

[The prepared statement of Dr. Young follows:]

PREPARED STATEMENT OF DR. YOUNG

Mr. Chairman:

I am pleased to be here today to assist your subcommittee in its inquiry into the chemical daminozide, a plant growth regulator, and the consequences of daminozide residues in children's diets.

This is a subject that has generated considerable controversy and fear. So much so, that several school districts, including nearby Fairfax, VA, have recently banned apples from their school lunch programs. In light of these kinds of actions, it is imperative that the American people hear from us today whether apples, other fruits and processed fruit products, are safe to eat and to provide to their children—and about the steps their Government is taking to ensure that the Nation's food supply is safe.

The chemical daminozide, or its trade-name Alar, has been used since 1963 on apples to increase fruit firmness, enhance color and extend storage life. It has also been used on Concord grapes, sour cherries and other fruits and vegetables for increasing yields and improving harvest quality.

Studies in the 1970's first indicated that daminozide has carcinogenic potential in laboratory animals. In 1984, a degradation product of daminozide, UDMH (unsymmetrical dimethyl hydrazine) was also identified as a potential carcinogen in laboratory animals. The significance of these data has been the subject of considerable scrutiny by The Environmental Protection Agency (EPA). In February 1989, the Natural Resources Defense Council released a report that reviewed daminozide and concluded that it posed an unacceptable cancer risk to children. Recently, EPA has suggested that apple growers and other users consider eliminating all daminozide uses for the 1989 season on a voluntary basis while it proceeds with the administrative process defined by statute pursuant to a final cancellation decision.

In light of these events, consumers are asking whether they should refrain from purchasing products that have been subject to treatment with daminozide. There is special concern about potential residues of daminozide in processed apple products intended for consumption by infants. As the Federal agency that samples the food supply for pesticide residues, FDA's experiences with regard to daminozide may be helpful in providing an answer to this question.

As you know, our statutory role is to police the food supply to determine whether pesticide residues are within the tolerances established by EPA. The authority to regulate these chemicals is split between the two agencies. EPA is responsible for permitting or canceling usage of pesticide chemicals based on a thorough evaluation of toxicology and other data. EPA is also responsible for establishing tolerances for pesticide residues that may remain on agricultural commodities when the pesticide is used. Safety margins and conservative assumptions are built into such tolerances. FDA monitors foods to assess compliance with such tolerances and takes corrective or regulatory action when violations are encountered.

For daminozide, EPA established several tolerances, depending upon the commodity. For apples, the tolerance is 20 parts per million (ppm). FDA enforces this and all other pesticide tolerances by collecting samples from individual tots of both domestically grown and imported foods and analyzing them for pesticide residues. The methods we use to analyze these samples are generally capable of determining pesticide residues at levels well below tolerance values. For daminozide, for example, FDA's methods can detect at least 0.5 ppm. When violative residues are found in domestic samples, FDA can initiate various sanctions such as a seizure or injunction. For import samples, shipments may be detained at the port of entry when illegal residues are found.

Certainly FDA resources are not unlimited in regard to sampling domestic and imported foods for filth, microbiological, or chemical contaminants including pesticide residues. For example, last year FDA sampled approximately 18,000 food shipments for pesticide residues. Over 10,000 of these were imported foods. Further, products found not to contain violative residues of a particular chemical may not be sampled for that chemical as frequently as others. In this way, FDA husbands its inspectional resources and attempts to focus them to best advantage.

Data from over 25 years of FDA monitoring of the food supply have shown that residues that do not comply with EPA tolerances are very uncommon, indicating that pesticide chemicals are generally used according to label directions. In 1987, for example, above-tolerance residues were found in less than one percent of the samples, and in 57 percent of the samples, no residues were found at all. These percentages for 1987 are typical of prior years' experiences.

Over the years that we have monitored apples, processed apple products and other commodities, we have yet to find a single sample in which residue from daminozide exceeded the tolerance. We rarely find levels that even approach a tolerance. Of the nearly 800 samples analyzed for daminozide since 1981, the highest residue found was 8 ppm—less than half the tolerance—but even this finding was unusual. In 1986, a special survey for daminozide residues in selected fruits and processed foods produced the same low findings relative to the established tolerances. This consistency of findings over the years provides us with confidence that additional sampling would not have uncovered anything different.

Recently, moreover, the percentage of apples that we have sampled that contained detectable levels of daminozide has dropped to approximately 10 percent—down from approximately 40 percent in the early 1980's. This observation is consistent with industry reports of rapidly decreasing usage. Industry sampling has yielded similar results, both in terms of the levels that are found well below tolerance and the decreasing frequency with which residues are found at all.

We fully appreciate that the toxicological significance of the minute quantities of daminozide actually being found on foods is a question currently subject to intensive review within EPA. Nonetheless, we believe that some helpful conclusions are still possible based on our sampling results and the surveys done by others, such as the National Food Processors Association Monitoring Study. The consistently low residue levels coupled with a drastic reduction in the use of daminozide indicate that dramatic action by consumers is not warranted. At this time there does not appear to be a need for panic.

Mr. Chairman, this concludes my formal testimony, I will be happy to answer any questions you may have.

Senator DODD. Dr. Moore.

Dr. MOORE. Thank you, Senator Dodd.

I will just highlight some points that are in my testimony. I might start out as saying as it relates to the process whereby data is analyzed and safe residue levels are determined as it relates to pesticide use that might leave such residues in food, the process that the agency uses on that is most extensive, has been dramatically updated in the last several years, and far from being an old process that is terribly flawed, has become a model that is being copied throughout the country and throughout the world.

In setting new tolerances and reviewing existing tolerances, we are concerned about protecting children. We do not focus on the traditional practice of only try to set based on adult consumptions. EPA's analysis of pesticides in the diet takes into account that children and infants typically eat more food in relation to their body weight and more of certain types of food than does the average adult. We average that factor in when we come up with estimates of what the risks may or may not be of a product such as Alar that may have residues in apples or apple-derived products.

It is an approach through a system that we have developed over the last several years that allows us to account for sub-populations that may be at special risk because of the dietary habits that are associated with those sub-populations.

We are also concerned about the possibility that children and infants may be more sensitive to the toxic effects of pesticide residues in their diets than are adults.

Unfortunately, scientific data to resolve that uncertainty are limited and frankly are inconclusive. Available studies actually show

mixed results. That is, young test animals have shown both greater and lesser susceptibility or sensitivity to exposure to chemicals.

Although we believe that our approach to tolerance-setting adequately protects the young, the agency has contracted with the National Academy of Sciences to study just this issue. That study, which was begun last year, is examining the methods employed to assess risks posed by pesticides in the diets of infants and children.

In discussing this study, the academy made a statement several weeks ago, and let me quote: "This study derives from the general consensus that new methods may be available to improve risk assessment methods and better protect the public health. It is important to note, however, that this study does not arise from the documented increase in any disease or adverse health condition in infants, children or adults resulting from exposure to legal levels of pesticides in the diet." That is their statement, Mr. Chairman, not mine.

Using what we believe are the most reliable data, EPA estimated the theoretical risk of developing cancer from exposure to Alar and found out that it exceeded theoretical calculation of greater than one in one million increase in cancer risk over the lifetime of an individual. It was on this basis that EPA announced the initiation of the legal process which will result in a final cancellation decision after its proposed action has been reviewed by an expert science panel. While the risk is greater than one in one million, it is not of a magnitude, however, which dictates an imminent, overwhelming harm.

Alar residues, I believe, should be removed from the Nation's food supply—to make a safe diet safer—to eliminate a dietary risk that is unacceptable from a long-term perspective.

Finally, I have stated previously that I do not believe that the risk estimates found in the NRDC report are correct. I think they are overstated, and my testimony goes into that in greater detail.

I do think, however, that certain of their general recommendations certainly have merit and should be considered further. For example, I certainly support requiring registrants to develop better analytical methods for measuring pesticide residues and to generate more data on where and at what frequency and at what level those residues may be found. We are doing just exactly that and have done that in the last couple of years for Alar.

In addition, I have repeatedly stated the need for changes in the law to allow us to get a pesticide off the market more quickly and easily once a problem has been identified. Despite my repeated statements to that end, there have been no changes in that aspect of the law.

I also find merit in the suggestions to increase consumer understanding of the risks and benefits of pesticide use and for efforts to increase education for farmers on alternative cost-effective control measures.

I welcome constructive debate on issues such as were raised in the NRDC report. Such a debate can only lead to a better system for all of us. These issues should not be divisive. We all want to protect public health. But if misinformation and fear dominate the debate, there is a very real chance that we will be making poor de-

cisions. And if that happens, it is the public—including our children—who will bear the consequences of such an event.

Thank you, Mr. Chairman.

Senator DODD. Thank you very much, Dr. Moore.

[The prepared statement of Dr. Moore follows:]

PREPARED STATEMENT OF DR. MOORE

Good morning, Mr. Chairman and members of the committee.

Thank you for this opportunity to address the issue of pesticide residues and food safety. Recent events have raised the question of whether EPA's tolerance setting process is adequate to protect the public—and especially children—from the risks posed by consuming pesticide-treated foods. EPA believes that foods containing pesticide residues resulting from legal use of pesticide products are generally safe. In fact, the food supply of the United States is among the safest in the world.

EPA uses a sophisticated and protective process to evaluate the risks posed by pesticides in the diet. Our process follows the approach to risk assessment recommended by the National Academy of Sciences, and it has been copied by foreign governments and International bodies throughout the world.

Today, I will first briefly describe our tolerance setting process and how it is designed to protect children. Next, I will specifically address the recent Natural Resources Defense Council (NRDC) report entitled "Intolerable Risk: Pesticides in our Children's Food." I believe that this report, which challenges our tolerance setting process and asserts that children, in particular, face a "massive public health problem" from pesticide residues in foods, misleads the public. Finally, while I believe our tolerance setting system is sound, we are improving it. Thus, I will outline the steps EPA already has underway to strengthen the tolerance setting process and additional measures that could be considered to improve food safety.

The Pesticide Tolerance Setting Process

EPA requires submission of extensive data to obtain registration for a new food use pesticide and to establish any necessary tolerances (the legal maximum residue that may remain on food). Altogether, EPA requires up to 69 different studies—many of which require the use of different species, so that the actual number of tests could exceed 100—at a cost that could exceed $10 million. By the time EPA is ready to authorize a new pesticide to be used on food, EPA knows a great deal about that pesticide.

EPA's basic approach to evaluating risk is conservative and protective of public health. EPA uses animal tests to identify the most severe short- and long-term hazards associated with a pesticide. An uncertainty factor is applied to the level demonstrated to cause no observed effects in these animal studies to establish a level of pesticide exposure acceptable for human beings. The uncertainty factor is intended to allow an extra margin of safety to compensate for (1) the scientific certainty inherent in the process of extrapolating human risk projections from animal data, and (2) the possibility of differing sensitivities to the pesticide in individuals or subgroups among the general human population. The magnitude of this factor may vary depending on the toxicological effects observed in laboratory animals, and the amount of toxicity data available, but a 100-fold uncertainty factor is commonly used.

EPA does not use the "uncertainty factor" approach, which implies a threshold of risk, in considering a tolerance for a carcinogen. Instead, the agency estimates an upperbound of lifetime risk for varying exposures. EPA also uses dietary exposure estimates, based on residue data and food consumption data, to estimate a lifetime risk which we are 95 percent confident will not be exceeded. This is a very high degree of confidence and actual risks may in fact be less than this risk estimate or even zero. It is the agency's stated policy that, in general, it will establish tolerances for carcinogenic pesticides only if the lifetime dietary risk is negligible. Traditionally, EPA and other Federal agencies consider risk that is one in a million or less to be negligible. Since the agency calculates a risk to an individual over a 70-year lifetime, starting with exposure in childhood, these risk estimates include childhood as well as adult risks.

Finally, regardless of the type of risks which may be associated with a pesticide, EPA sets tolerances at a level no higher than necessary to accommodate residues resulting from proper use, even if a higher level would not pose a health risk. If proper use would pose unreasonable dietary risks, the agency generally would not set tolerances at all. I'll return to this point in a moment.

Protecting Children

In setting new tolerances and reviewing existing tolerances, EPA is concerned about protecting children. EPA understands that some sub-populations—especially infants and children—receive significantly higher than average exposure from certain foods. To guard against possible problems from such higher exposures, EPA routinely calculates and considers both a composite lifetime exposure for an average individual, as well as exposure values for over 20 sub-populations with potentially higher exposures—including infants and children. Thus, EPA's analysis of pesticides in the diet takes into account that children and infants typically eat more food in relation to their body weight, and more of certain types of food, than the average adult. Using these exposure estimates, EPA evaluates average lifetime risk, as well as the risk for sub-populations with higher exposures. Generally, EPA bases its tolerance decisions on the composite average lifetime risk which includes the proportionately greater exposure that occurs in childhood. The calculations for other sub-populations allow us to ensure that no particular group receives exposure which is likely to cause unreasonable risks. This sophisticated approach which allows us to account for sub-populations is the result of improvements in the process which have been implemented over the past several years. We will continue to systematically apply this approach to the reevaluation of old chemicals during the implementation of FIFRA 1988 amendments.

EPA is also concerned about the possibility that children and infants may be more sensitive to the toxic effects of pesticide residues in their diets than are adults. Scientific data to resolve this uncertainty are limited and inconclusive; available studies actually show mixed results—that is, young test animals have shown both greater and lesser sensitivity to chemicals than adult animals. Although EPA believes its approach to tolerance setting adequately protects the young, the "agency has contracted with the National Academy of Sciences (NAS) to study this issue and make recommendations on whether changes are needed in the agency's risk assessment process.

The NAS study, begun in 1988, will examine the methods employed to assess risk posed by pesticides in the diet of infants and children. In discussing this study, the academy said: "This study derives from the general consensus in the scientific community that new methods may be available to improve risk assessment methods and better protect the public health. It is important to note, however, that this study does not arise from the documented increase in any disease or adverse health condition in infants, children, or adults resulting from exposure to legal levels of pesticides in the diet." We expect to receive the report of this study in 1990.

NRDC Report on Pesticide Residues in Food

A flood of recent phone calls and letters to EPA indicate great concern and confusion among the public regarding the safety of the food supply. We believe this confusion and concern results largely from the publicity surrounding the recently released NRDC report, which sends the message that pesticides in fruits and vegetables are threatening children's health. The public is being led to believe that there is a massive and imminent public health problem from pesticide residues in food. They are being led to believe that their children are at very high cancer risk due to Alar residues in apples and apple products. This is simply untrue. EPA has taken a number of precautionary measures to reduce Alar exposure. These include lowering the tolerance for daminozide residues on apples from 30 ppm to 20 ppm and reducing the application rates. We have accelerated the special review and plan to propose Alar's cancellation within 90 days. This is being done using preliminary data before the animal study is completed, an unusual action. The short-term risks associated with continued use of Alar at the present level are not significant enough to justify emergency action to remove Alar from the market. As was said earlier, we believe the overall food supply is safe. Drastic dietary changes to eliminate apple products or to discontinue eating fresh fruits and vegetables are not necessary.

It is of interest to note that on March 1, 1989, The National Research Council (NRC)—a part of the National Academy of Sciences—released the most comprehensive report ever assembled on the relationship between diet and health. The NRC found that there was no evidence that residues of individual pesticides in our diet contribute significantly to the overall risk of getting cancer. In contrast to the recent publicity, the NRC, looking at the American diet from a nutritional viewpoint, actually concludes that Americans can reduce their risk of cancer by eating even more fresh fruits and vegetables.

NRDC has calculated the cancer risk attributed to Alar and its breakdown product, UDMH, to be over 100-fold greater than EPA's traditionally conservative estimate. NRDC used cancer potency estimates from data on UDMH which were rejected by our independent scientific advisory panel (SAP) in 1985. The SAP questioned the appropriateness of using these data for generating risk assessments for regula-

tory purposes. We have since required Uniroyal Chemical Co., Inc., which makes Alar, to conduct new cancer studies, and EPA has based its current risk estimates on preliminary results from these new studies. NRDC also made use of food consumption data to generate higher estimates of exposure. Furthermore, while the food consumption data used by NRDC were more recent, they were based on a small survey study (only 2,100 people) which had relatively poor participation (only a 65 percent completion rate). EPA used a much larger survey conducted by USDA in 1977-78 (over 30,000 people were surveyed) which had an extremely high completion rate (over 95 percent). (That survey is currently being updated to reflect 1987-88 data.)

Using what we believe are the most reliable data, EPA estimated the theoretical risk of developing cancer from exposure to Alar exceeded 1 in 1 million. It was on this basis that EPA announced the initiation of the legal process—which will result in a final cancellation decision after its proposed action has been reviewed by an expert science panel. While the risk estimate is greater than 1 in 1 million, it is not of a magnitude which dictates an imminent, overwhelming harm.* Alar residues, I believe, should be removed from the Nation's food supply—to make a safe diet safer—to eliminate a dietary risk that is unacceptable from a long-term perspective.

Furthermore, let me emphasize that these risk estimates are theoretical calculations, which are based on animal testing, are fairly rough estimates and are not precise predictions of human disease. EPA uses a 95 percent confidence limit on the estimated risk to place an upper bound on the risks. Real risks are not expected to be higher than this, and may well be lower—even zero. Unfortunately, qualifications like these are not well understood outside the scientific community. In the public debate, statistical projections are perceived with absolute certainty as resulting in fatal cancer cases.

Finally, it is important to note that the agency believes significant reduction in the use of Alar has already occurred. EPA estimates that Alar is only used by approximately 5 percent of the Nation's apple growers, down from 25 percent when the agency expressed serious concern about the continued use of Alar in 1985. Many supermarkets and food processors have pledged to sell or use only untreated apples. While residues have been found in apples and apple products of firms that have said they have stopped using treated apples, the levels that have been found are generally quite low, well below the legal limit of 20 parts per million. Some of the residues in processed products that have been detected could be due to use of Alar several years ago. We expect current usage will further decline as a result of changes in the marketplace.

Improving EPA's Food Safety Program

Even though EPA believes our general risk assessment methodology is sound and our tolerance setting system is protective of public health, our system is not perfect. Over the years, as we have recognized aspects that need improvement, we have taken steps to strengthen the process. Our efforts have focused on gathering better, more complete data about pesticides, refining our ability to estimate dietary exposure, and reducing other areas of scientific uncertainty associated with risk assessment. Examples of such activities include: Developing the tolerance assessment system (TAS), a computer model which enhances our ability to evaluate dietary exposure of different subgroups including infants and children in the U.S. population; commissioning a National Academy of Science study on the regulation of carcinogenic pesticides ("The Delaney Paradox") which recommended a "negligible risk" approach to setting tolerances; and the NAS report mentioned earlier on risk issues for children and infants (begun in 1988 and due in 1990). Perhaps the most significant action supported by EPA in recent years has been in the 1988 legislation which will accelerate the reregistration of old pesticides and the reassessment of food tolerances based on complete and updated data.

The agency also is revising its testing requirements for pesticides to include more extensive testing for effects on the nervous system. In October 1987, a subpanel of our FIFRA scientific advisory panel met to review the agency's plan to adopt the guidelines developed under the Toxic Substances Control Act for the assessment of neurotoxic effects resulting from exposure to pesticides. The subpanel generally endorsed the adoption of these guidelines and recommended routine testing of pesticides for observation of neurologic signs, motor activity and neuropathology. We also plan to test certain classes of chemicals for developmental neurotoxic effects, that is, animals exposed in utero will be tested for behavioral changes and neuro-

* The actual calculated risk was 45 in a million theoretical cancers per one million population over a 70 year lifespan.

pathology. Most of these tests can be readily incorporated into the standard toxicity testing currently required for all pesticides. The agency is currently working on revising these neurotoxicity guidelines based on our experience to date. The first set of guidelines, encompassing the three tests which may be required, are expected to be ready for review by the SAP and the public by June of this year.

Finally, while I do not feel that NRDC's estimates of risk were scientifically sound, I do think certain of their general recommendations have merit and should be considered further. For example, I support requiring registrants to develop better analytical methods for measuring pesticide residues and to generate more data on actual residue levels in food. As many Members of Congress know, I have repeatedly stated the need for changes in the law to allow us to get a pesticide off the market more quickly and easily once a problem has been identified. I also find merit in their suggestions to increase consumer understanding of the risks and benefits of pesticide use and efforts to increase education for farmers on alternative, cost-effective pest control methods that could aid in reducing pesticide applications.

I welcome constructive debate on the issues NRDC has raised: Such a debate can only lead to a better system for all of us. These issues should not be divisive; we all want to protect public health. But if misinformation and fear dominate the debate, there is a very real chance that we will make poor decisions. If that happens, it is the public—including our children—who will bear the consequences of our failure.

Senator DODD. Dr. Prothrow-Stith.

Dr. PROTHROW-STITH. Good morning. It is a pleasure for me to come and represent the State of Massachusetts, the staff at the Department of Public Health, and my predecessor, Dr. Bayliss Walker.

In May 1986, Massachusetts became the first State to set tolerance levels for daminozide in heat-processed apple juice, applesauce, infant and baby foods. That decision was made by the State based on public health law after a pretty tremendous amount of processing and effort. There were public hearings that included the industry, the organic farmers, the pediatricians; that kind of public testimony went to our Pesticide Review Board.

At that point, the Pesticide Review Board voted not to ban daminozide because of the lack of conclusive scientific evidence. Yet the Department of Public Health was pretty struck with those flawed studies. Although they were flawed, the multiple sites and the multiple strains of animals that developed tumors and the numbers of tumors and the sizes of the tumors were quite compelling.

The structure of the chemical is very similar to known carcinogens. With that information and the known susceptibility in terms of children taking in more of these products—when we looked at apple juice for children under the age of one, there was a 42-fold increase in the amount of consumption of apple juice.

With that in mind, based on the public health laws, we set tolerances in our food products sold in the State that were stricter than the current EPA tolerance levels.

There was a three-fold phase-in process, and over the course of about 18 months, the industry has complied with that level of tolerance. And in fact, we have not had any obvious effect on the availability of apples or apple products or the cost of such products.

What is very interesting is that most of the baby foods that are sold in the State are daminozide-free, and that has had implications for the rest of the country. Because that kind of process had to take place for sale in Massachusetts, you will find that most of the infant products have gone through almost a voluntary reduction or elimination of daminozide across the country.

We support strongly the plan at the end of 18 months. We feel that, based on the scientific protocol now followed by EPA that does not have the flaws of the early protocol, that the kind of plan that has been initiated, canceling the use of daminozide in the country, is an appropriate one.

In addition to that, we support the action to have States maintain the ability to set tolerance levels that are stricter than those set by EPA. We support the use of children's risk factor in EPA protocols, and we encourage the expeditious process of updating tolerance levels.

Some of the pesticide levels were set prior to 1975, and many of them do not reflect the current level of information. So we support the expeditious process in updating those tolerances.

Again, thank you very much for your interest in this issue. We strongly support the action of EPA at this moment.

Senator DODD. Thank you very much, Doctor.

[The prepared statement of Dr. Prothrow-Stith follows:]

PREPARED STATEMENT OF DR. PROTHROW-STITH

My name is Deborah Prothrow-Stith. I am the commissioner of the Massachusetts Department of Public Health.

The issue of pesticides in food and exposure to sensitive populations such as children has been a priority at the Massachusetts Department of Public Health for many years. We believe that the U.S. Environmental Protection Agency should take into account the exposures of children to pesticides through the diet when making pesticide registration decisions. In certain of these cases we have felt it necessary that States take the lead and adopt protective standards to afford infants and children the protection they need.

On May 13, 1986, Massachusetts became the first and only State in the Nation to adopt regulations setting limits, or action levels, for amounts of daminozide in heat-processed apple juice and sauce, and infant and baby foods. The regulations set forth a three-tiered process for phasing out detectable levels of daminozide from all commercially available applesauce and apple juice, regardless of where the apples are grown, by October 1988.

The regulatory scheme was based upon an extensive testimony presented at a series of public hearings, a review of the pertinent scientific literature, and discussions with industry. In promulgating these regulations, the department cited the increased health risk to infants and children from exposure to daminozide and its metabolite, unsymmetrical dimethylhydrazine (UDMH), and the increased consumption of applesauce, apple juice, and infant and baby foods by infants and children.

The weight of the qualitative evidence of the carcinogenicity of daminozide is compelling. Both daminozide and UDMH meet EPA criteria for classification as "probable human carcinogens." Test results show that the tumors were induced at multiple sites in multiple strains and species of test animals.

Although there have been critics who have questioned the validity of some of the animal studies, there is sufficient scientific evidence to support the efficacy of these studies. Methodological or procedural flaws in the oncogenicity studies do not invalidate the weight of evidence contained within the various tests which have been performed. Some of the criticized protocol are in fact generally accepted procedures in the scientific community.

In addition, structure-activity relationships of these hydrazine compounds support the likelihood that they are carcinogens and can cause chromosomal mutations. The types of tumors induced by both substances are similar to those induced by over 30 hydrazine compounds which are known animal carcinogens.

Tests also indicated that UDMH is a more potent carcinogen than daminozide. This is significant because up to 5 percent of daminozide in the raw apple converts to UDMH when the apple is heat-processed into apple juice or applesauce. Consequently, the level of UDMH in heat-processed apple products will always be higher than the level found in the apple. Given the current status of regulatory testing methods for UDMH, effective control of UDMH levels in processed food can only be achieved by setting specific action levels for daminozide.

The department determined that children are at a greater risk than the general population from exposure to daminozide and UDMH for three major reasons:

The first factor that puts children at increased risk is their increased consumption of applesauce and apple juice when compared with adults on a gram per kilogram of body weight basis. Results from a 1977 USDA nationwide survey provided by EPA show a six-fold increased consumption of apples and apple products by children aged 1 to 6 years when compared with adults, a 14-fold increase for nursing infants less than 1 year old when compared with adults, and a 19-fold increase of non-nursing infants when compared with adults. A breakdown of these data reveals a nine-fold increase in consumption of apples and applesauce, and a 42-fold increase in consumption of apple juice for infants less than 1 year old when compared with adults. Additional dietary exposures not considered in these calculations are non-apple products, such as other fruit juices and cookies, that are "naturally sweetened" with apple juice.

Second, the cells of children exposed early in life to carcinogens which are cancer initiators (carcinogens that begin the transformation of cells from normal to abnormal growth), such as UDMH, have more chance to progress to fully developed cancers simply because they have more time for late-stage transitions.

Third, children may be more susceptible to carcinogens, particularly initiators, because their organs are still developing, their cells are rapidly dividing, and the differentiation process is not yet complete. Young, rapidly dividing cells have long been shown to be more sensitive to numerous environmental toxic exposures. This inherent susceptibility of cells was estimated in testimony at the Massachusetts public hearings as producing an additional increased risk of 1-10 fold.

Both Federal and State health-related agencies have adopted as policy the principle that there is no safe threshold level for exposure to carcinogens. No safe threshold levels have been documented. This principle has been affirmed by the National Cancer Institute, the Occupational Safety and Health Administration, and the EPA. The Massachusetts Department of Public Health has operated under this principle for years, and strongly affirmed this principle in developing its policy on the regulation of ethylene dibromide (EDB) in 1984 and daminozide in 1986.

Prudent public health policy dictates that significant efforts be taken to minimize exposures of infants and children to carcinogens. In order to reduce or minimize exposure to daminozide and UDMH for the population at greatest risk, infants and children, the department set action levels for all heat-processed applesauce and apple juice products. Lower levels were set for infant and baby foods, which are the products specifically intended for consumption by babies.

Since the department's regulations went into effect in October 1986, there have been no violations of the action levels reported through our regulatory testing program.

The authority of the department under its food protection laws to set action levels more stringent than those set by the Federal Government for pesticide residues in food was recently affirmed by the Massachusetts Supreme Judicial Court. The decision stated:

While Federal levels usually will provide a beacon, leeway is allowed for independent State determinations . . . A State law simply mimicking existing Federal provisions would serve little purpose.

The case of daminozide underscores the need for States to have the full authority to implement their own risk management strategy when necessary. The State's authority to regulate food safety represents an important check on Federal decision making. There have been cases where the Federal Government has not been able to move quickly or forcefully enough. In these cases, States must have the flexibility to act. When human health, especially that of infants and children is at stake, and prevention of disease and dysfunction is possible, waiting for more perfect data which may never develop can cause great harm if a pesticide turns out to pose a severe risk.

In conclusion, we recommend that the EPA:

(1) Formally incorporate exposures to children into their risk assessments;

(2) Update tolerances, particularly those set for the older pesticides registered prior to 1975, such that they include more recent scientific studies and exposure data; and

(3) Ensure that tolerances are being actively enforced by supporting efforts to provide the FDA with the resources it needs for adequate monitoring of the Nation's food supply.

Senator DODD. We appreciate all three of you being here this morning, and at the request of my colleague from Utah, he had

asked that the three of you be allowed to testify early, and I hope in fact that your testimony will be helpful to those who follow on, in terms of their own comments they would like to make.

Dr. Moore, on the "60 Minutes" program, you said that if Alar were a new pesticide, it would not be allowed to be used, but yet as an old pesticide, you cannot remove it from use. Doesn't that create exactly the kind of standards which worry the American public? If this were coming on the market now, you would say no, it is too dangerous. And yet because the burden of proof shifts, you cannot make that determination. Why?

Dr. MOORE. Senator, your paraphrasing of my response is correct. If Alar were a new chemical coming to the agency to get on the market today, it would not be allowed on the market, based on the data that we had.

Senator DODD. Why?

Dr. MOORE. Primarily because the data that we had first of all would be incomplete; but more importantly, the data would be showing that it posed carcinogenic risk and that indeed the residues that would be associated with that chemical's use would exceed our policy of negligible risk, so therefore we would not let it on the market.

Senator DODD. And given the consumption of apple products by children, it would be a greater risk for children.

Dr. MOORE. Senator, what happens is that one's risk to Alar is not uniformly divided over, say, the average 70-year life span. But because a child has a high level of food consumption relative to body weight and also has apples as a very high proportion of its diet during its first few years, the proportion of the total theoretical lifetime burden is basically realized in this circumstance early in life.

We do try—we have calculated that in our recent Alar calculations and find that we indeed have this unacceptable level of risk.

Now, why do I say we would not let it on the market if it were a new product, but it remains on the market if it is an old product? FIFRA is a risk benefit statute. The statute clearly identifies that there may be some risks attendant with pesticide use, but on net we might want to tolerate those risks as a society because of the benefits derived from those products' uses.

All right. I have to make a risk benefit analysis for an existing product. If I do not have risk data to put into my analysis, I cannot make an analysis that says that there is a negative risk if indeed I do not have anything in the risk part of my cancellation.

We proposed to cancel Alar several years ago. Our outside expert group of scientists said the data was flawed and should not be used for making such a significant regulatory decision. Absent that type of information to use as part of my risk benefit balance, all I have left is the benefit part of the equation. I can no way find a legal basis to sustain an attack should I have taken such an action.

Senator DODD. Well, isn't one of the problems that when you are examining the relative risks of a pesticide, you look at each one of them; you do not take into consideration the totality of the pesticides that the average person may be consuming; you look at them one at a time.

Dr. MOORE. We certainly look at them one at a time. That has been the historic practice. More recently, as we look at pesticides that may pose a risk—fungicides, for example, of which there probably are eight or ten that are the major products used in agriculture today, are in the food processing industry. We have tried to take a holistic approach so that we do not end up causing a perverse consequence, which would be that the first one that comes up, you say, gee, there is some degree of risk associated with that, so you eliminate it, and with the luck of the draw being that the one that is finally retained—which now has extreme benefit because there is nothing else to use—might also pose the greatest degree of risk.

So we are trying to take a look at fungicides in my example holistically, so that indeed we can end up making a determination, if some have to be eliminated, that we take the ones off that pose the greatest degree of risk and retain those that may indeed have minimal risk or minor risk, but still confer the same degree of benefit. It is a more difficult process when you start looking at eight or ten at the same time.

Senator DODD. Dr. Young, what percentage of pesticides on the market does the FDA test?

Dr. YOUNG. We are able to test approximately 50 percent of those on the market.

Senator DODD. So 50 percent are not tested at all.

Dr. YOUNG. The problem that we have fundamentally is that we use the pesticide methods that are developed by EPA in part of their approval process. When we look at these, we have to use, where we can, multi residue methods. In the absence of that, checking each product for 425 pesticides would not be possible. So we take the ones that are the most risky according to what EPA advises us. We look at those critically, and we then say if we look at 50 percent, and we find that those stay well below the tolerances, it is likely that the other 50 percent do. But can we see them all? At this point, no.

Senator DODD. My point is this. Fifty to 60 percent—because there are some that claim you only actually get to about 40 percent of the pesticides on the market—only 50 percent of these pesticides EPA allows to be used on food—in other words, you really just don't know.

Dr. YOUNG. That is correct.

Senator DODD. Now, we heard Congressman Sikorski talk about some of the problems that you face.

Dr. YOUNG. That is correct.

Senator DODD. I would like you to comment, if you could. In fact, have you lost 1,800 inspectors over the last 8 years, and to what extent or degree did the Reagan budget cuts affect your ability to keep those inspectors or to hire more to deal with these kinds of problems.

Dr. YOUNG. This is not a political Democrat or Republican issue because since 1977, the agency has decreased. The total agency is down 15 percent since its peak in 1977. In the field, where we do our most significant work, where I have got right now 150 people pulled from all over the agency looking at the Chilean fruit, we are down 22 percent, with increasing responsibilities.

Is Mr. Sikorski knowledgeable of that? Yes. I have said repeatedly before that panel if you want me to do the job, give me the resources. It is not fair. It is a cruel joke to pass, as there have been, over 20 bills, requiring more work, and decrease the resources. And the American people need to know that.

In regards to daminozide, though, taking the 1986 study alone, if we take the State of Massachusetts' tolerance, which I just asked her, which is now one part per million, there was only one of those samples out of 36 that was above the tolerance, her tolerance of one, and that was one at 1.1. All the rest were below that.

Dr. PROTHROW-STITH. I would suggest that that is because in 1986, we passed those standards, and particularly for infant foods, they in essence became national standards. The Federal standard at that point was 30 parts per million, and dropped to 50 parts per million. But at that point, none of the foods had above 20 parts per million. So it was really not a significant drop from 30 to 20 parts on the part of the EPA. But I would suggest that the reduction in daminozide that we have seen, and the fact that baby foods in particular are in compliance with the standards, has a lot to do with the publicity and the standards set in 1986.

Dr. YOUNG. I do not wish to correct my colleague, but the only one that was 1.1 was in apple juice for children. I will submit this for the record.

I concur that in general the use has gone down, but this is not unusual since the early Eighties as well. But I do feel that one of the failures that we have is that we have not supported a general pesticide compliance program in the way that I think it is appropriate. I wanted to say that clearly, sir. But that is not a Republican administration or a Democrat administration.

Senator DODD. Yes, I think it is important the point you have made, and I think you will find very sympathetic ears, generally, in that regard. Obviously, if you do not have the resources or personnel to do things, it makes it difficult, and no one is disagreeing with you about that. We may be disagreeing about how much we can afford to do, given the fiscal realities, but we are certainly not unsympathetic to the fact that you have got to have the personnel on hand to be able to do the job.

Dr. YOUNG. You see, the point that I was trying to make, sir, is that there is more of an economic loss when we have a crisis like this and panic.

Senator DODD. But you understand, Doctor, as well, that when the American consumer learns that only about 50 percent of the pesticides on the market are being tested, and that EPA has no other basis to go on, and that in fact we discover that if a particular pesticide that were to be banned were to come on the market today, but cannot be, because of the way the relative scheme works, and that in fact, when we test these things, we test them one at a time, while all of us know that we are consuming more than just one, that the net effect of all of this. So there is legitimate concern here and not unfounded concern, and I think you respect that.

Dr. YOUNG. I do not doubt the concern, I really do not.

Senator DODD. And I think the American public respects the fact that you have not had the kind of resource capacity to maybe deal with this as effectively as you would like, I presume.

Dr. YOUNG. That is absolutely true. And that is why I wanted to say so clearly that it is important to match expectation with reality.

Senator DODD. I understand.

Dr. Moore, on the "60 Minutes" program again, you said it would take about 19 years for the EPA to remove Alar from use after the first evidence of a potential problem was identified. Nineteen years?

Dr. MOORE. I do not believe I said that, Senator. I think the point that was being made, to my recollection, was that 19 years after some of the early studies that were done either at the University of Nebraska or elsewhere were some of the early studies that were discredited by our Science Advisory Board in 1985 as being of flawed value, that it would be 19 years from that time before EPA would have finally taken Alar off the market if the action we announced in January were to be realized in the next 10 or 11 months. I think that was the context in which it was put.

However, I would like to point out a problem which I would like to highlight, and that is that the current statute, I think——

Senator DODD. Excuse me. Let me read this to you. You were asked by Mr. Bradley: "From the time the first red flag went up, it will have taken 19 years to get this stuff off the market, out of the food supply."

Dr. MOORE [responds.] "That is correct, based on the original studies back in the 1970's."

Correct. Those, I believe, would be the studies that were done at the University of Nebraska, which were discredited. While the studies were performed, they were found to be flawed by the expert science review group, which we must seek advice from, and based on their advice, we decided we would have to get new studies, which are the ones that we are basing our proposed cancellation on now.

Now, what has happened, and I am sure to the chagrin of the public if not also the agency, the results in the mouse studies which are now being done by the 1980 standards are showing the same type of tumor development that those early flawed studies also revealed.

What we can take comfort in right now in some respects, at least from a scientific perspective, is that those early tumor responses were causally related with the chemical and were not due to some of the flaws that were found in the new studies. You would not know that was absent in the new studies.

Senator DODD. OK. Let me come back to you now, Dr. Young. We had these studies back in the 1970's, and yet before 1981, you had not monitored food for Alar. And yet in fact there were indications that this pesticide raised the kinds of problems that Dr. Moore has just described.

Dr. YOUNG. We would not do that if the study looked to be flawed, and we depend on EPA's advice. We have to husband very scarce resources over all the pesticides, and we rely on EPA for the risk assessment and for guidance. We extensively looked into this

in 1981 and have followed it since then, but that was because of a growing concern that EPA had been triggering, and that is why I wanted to point out that even at the tolerances of the State of Massachusetts recently, we are in compliance in the Nation—based on a very limited study.

Senator DODD. Dr. Moore, the NRDC report raised concerns about neurotoxicity. Do you disagree with the NRDC about those problems, and why don't you first describe for us what "neurotoxicity" is?

Dr. MOORE. Well, neurotoxicity is the scientific term that is associated with the ability to cause harmful effects on the nervous system of the body. They use neurotoxicity or nervous system problems as an endpoint that they think should be of particular concern as it relates to chemical exposure, specifically pesticides, in newborn children. There is data that suggests that for some pesticides, the newborn or the infant might be more susceptible. That was the point I was trying to highlight in my summary statement, that there is also data that shows that for other chemicals, the newborn is more resistant than the adult.

The data seem to cut both ways, so you cannot make a general rule of thumb on it. We feel the margin of safety approaches that have been traditionally used adequately accommodate for these variances, if you will, between the newborn and the adult. But rather than just remaining sanguine about the situation, that is one of the things that we have specifically asked that academy committee that was formed last year to look at and tell us if indeed there are better ways for us to assess neurotoxicity concerns in the young, and if indeed there are, obviously give us advice as to what changes should be made.

Senator DODD. But you are not necessarily disagreeing with the conclusions of the NRDC on that.

Dr. MOORE. Oh, there is evidence that suggests that neurotoxicity could be a greater concern with some chemicals. We do require neurotoxicity testing.

Senator DODD. Including Alar?

Dr. MOORE. I don't believe that one would require a specific neurotoxicity test on Alar. I think what would be done on Alar would be any evidence of neurologic damage as part of a more traditional study, which would be revealed either at autopsy or by observation of the test animals.

Senator DODD. Just one or two more questions here, and then I will turn to my colleagues.

First of all, I am pleased to hear about the study that the National Academy of Sciences is doing on pesticides and children's diets. Do you think it is going to be possible, in your view, then, Dr. Moore, for us to devise a method of testing pesticides that would be child-relevant?

Dr. MOORE. Yes. But again, I think a problem you have, whether it is pesticides or any chemicals in general, the wide diversity of chemical structure and type suggests that indeed it is hard to develop a universal widget for testing that applies either for adults or children.

I think what we have to do is refine our ability to detect those chemicals that are deserving of maybe unique neurotoxicity evalua-

tion or immunologic evaluation or some of the other endpoints, such as we have tried to do for assessing possible birth defects concerned.

I would say as we sit here today that while a lot of work has been done in that area, I still think we are a number of years away from the scientific community being comfortable and with a consensus approach being able to identify exactly what should be done in that area.

Senator DODD. Second, Dr. Prothrow-Stith, I want to commend you on your recommendations to address these risks as they relate to children. I think that is important and urge you to keep it up.

Dr. PROTHROW-STITH. Thank you.

Senator DODD. I gather you feel that such methodology can be developed.

Dr. PROTHROW-STITH. Well, we think it is an important part of the research, and in fact, with the appropriate scientific community, that methodology can be developed. It requires getting both sides of the picture into the room and reviewing it from purely a scientific perspective and looking at the kind of methodology that would allow us to do that.

Senator DODD. Dr. Young.

Dr. YOUNG. Yes, I concur. I believe that it is very important that a lot of emphasis be placed on risk assessment so that we can determine between fact and fiction. It is a growing science, and I have been pleased to see in the last 4 or 5 years major strides in being able to deal with risk and risk assessment.

Senator DODD. Thank you.

Senator Adams.

Senator ADAMS. Thank you, Mr. Chairman.

I just have one question, but it is fundamental to your testimony, Dr. Moore. I am concerned about the fact and deal both with the people who are out on the farms where we end up with these 50-gallon drums of something that has been condemned, and they will say let's do away with the 50-gallon drums, and the question is if you try and put them into some dump someplace, you are probably worse off than if you sprayed them around and got rid of them under a tolerance level.

I cannot understand, and I would like to have you explain to me, why the private industry, which obviously does not want to put out a pesticide, a fungicide or, as in the case of Alar, something that is systemic, and have it have an adverse impact upon the public because it produces the disaster we have here at the marketing end of the process; and what the relationship is—it just does not seem to me that the Government agencies—and I have run a large Government agency on safety concerns in the Department of Transportation and so on—that there is not a closer and better and shorter time limit between your agency and those who wish to put the product on the market that could give us a safer result.

It seems to me that they are producing something, they say it is all right, and then you look at a substantial time period—we are talking 3 years, as I understand, with Alar, whereas the industry in my State said that when they got the word 3 years ago, 95 percent of them said, "We are not going to take a chance." And that

was strictly done, and yet that is the reason I made the comment I made earlier, that apparently the manufacturer is still making it.

Now, someplace in that, the Government and private industry have to function better if we are going to protect our children. To me, that is fundamental. I do not think it should take Uniroyal making it, the people using it, and yourselves 3 years when you have got this many warnings, to get to this disaster.

Now, is that because you are trying to examine too many of these, and they are pumping them out much too rapidly for you to handle all of them, or is it because people are saying, well, let's just put it out there, it really kills whatever it is we are trying to kill, and we are willing to take a chance that it may have some bad side effects later. To me, that is just kind of fundamental. I do not understand. There is parallel desire here, and yet you are treating this almost like we were inspecting something coming from a foreign planet for the first time. Maybe that is a little harsh, and any of you can comment on that——

Senator DODD. I would like to underscore that, Brock, as well, and Senator Symms raised it in his testimony. I gather he spoke to—I do not know whether it was you, Dr. Moore, or others, going back some time. Why haven't we just temporarily canceled this, taken it off the market? An awful lot of other people are not using this product who are processors and growers. If there are these kinds of risks, why should an entire industry be damned—rightly or wrongly, in a sense, but the realities of life are such that that is the case, I mean, that is the fact. Uniroyal is here, and they are a good corporate citizen in my State, and we are very proud of them there, and they are going to get a chance to talk about this product as something that they produce, and they should have that opportunity. But clearly, this has generated a lot of unnecessary harm, it seems, to us up here, and it seems to us unnecessarily so.

Why haven't you done that?

Dr. MOORE. Well, Senator, maybe Alar brings home a hard lesson. It is an old pesticide. The standards by which pesticides were judged and allowed on the market back in the Forties, Fifties, Sixties, even into the early Seventies, just do not cut it by the standards of the Eighties. And the challenge to this agency has been, for better than a decade now, to reassess the old pesticides under the same standards that you require for new pesticides. I have never heard anybody, in the 6 years I have been at the agency, criticize the new pesticide process. It is held to be extensive, exhaustive, and reasonably complete.

The problem is how do you retrofit the new requirements on the old materials, and then how do you act or move against an old pesticide when, on the basis of new data by the standards of the Eighties, you say it shouldn't be allowed to remain on the market.

I can only do that working with the statute that is available to me. The statute that is available to me described in great detail the process I must use to go through a cancellation process. The preferred process set up in that statute is a cancellation process, which, using Alar as an example, will take me until probably the spring of next year to finish in a formal sense and complete it.

Let us assume that our final decision is that which we have said we are going to move forward on, and we propose to cancel it. If

history is a guide, based on other pesticides made by other manufacturers, that typically has been challenged. That is allowed in the statute. If it is challenged, we then go into an administrative hearing process which, if history is a guide, will take an additional 3 years. According to the statute, a chemical stays on the market during the pendency of that total process.

That is what I have been saying for years needs to be changed.

Senator DODD. So even if you decided today to cancel, we are talking potentially 5 years before that could happen; even if the EPA reached that conclusion. I apologize to my colleague from Washington.

Dr. MOORE. Senator, I would like to make one other point and that is that there is a provision in the statute that allows for suspension of a chemical which would get it off the market immediately while the cancellation process then moves forward. The chemical is off the market if you suspend it while the cancellation process works.

Senator DODD. Are you considering that?

Dr. MOORE. We did consider that in review of the new data, and in our honest opinion the risks that we are talking about are not of a magnitude that tracks with what we think was in the mind of Congress when they wrote that suspension provision in the statute many, many years ago. And that is from somebody who has used the suspension mode, in the 6 years that I have been at EPA, twice. I used it on EDB, and I used it just a couple of years ago on dinazeb. So it is not like we are afraid to use it. It honestly, in my opinion, does not fit that mode to merit suspension. Other people honestly might disagree.

Senator DODD. Even though you would approve it if it were a new pesticide coming on the market today.

Dr. MOORE. Correct.

Senator ADAMS. Dr. Moore, that is why I asked the question. I have gotten the backwash of both of those. That is what I mentioned about the 50-gallon drums, was on dinazeb, where we are trying to figure out what we are going to do with that. What concerned me was the charge that was made that when we did this in 1972 to re-register, that only 2 of 390 pesticides have been examined—in other words, gone through; the ones that were already in place—and that there may be some 600 active ingredients in some 400 pesticides registered for food.

I just want to know whether the chairman and I and Senator Coats and others should be saying we want to have whatever number of people it takes, 600 or 700 people, to take 6 months or a year and go back and do the pesticides. I certainly do not want to have to try and get rid of them out there among all my growers when they are there. And yet I see that this may be one of a number of those starting.

Now, if you have a good new screening process, and you have this backlog, you tell us how we get rid of this backlog to protect our processors and our producers and the others, and I want to know where the back pressure is coming from. I can well assume that somebody who has been manufacturing something for a long time does not want to be told that they cannot manufacture it anymore. But the people I am interested in are the ones who are get-

ting killed in the middle. Right now, 95 percent of our apples have got no Alar in them, and those that do, you cannot find much. We have a blockade out there that means an entire apple crop will vanish, or could. And I do not think that is right. Therefore, if you would indicate whether they are private resources mixed with public resources, if you are supervising private chemists and the others, we need to be told that. We do not want to just be told that it is going to take us 19 months to work this thing out.

Dr. MOORE. Senator, the statement that refers to 2 or a handful of chemicals that have been completely re-registered is a correct number, if the definition is has every "i" been dotted, has every "t" been crossed. On the other hand, I would say as far as the core of information that would be of interest to this committee today, which is the basic health and safety information, I think that we have got reasonable information bordering on adequate, probably around 100 or 125 of the 300 major foods use pesticides. The others that are missing it are in the process of having those studies being performed, similar to the Alar studies that we are awaiting to be completed in July and in January of next year.

So I think that is maybe a better perspective rather than just two. At the same time, while everybody has agreed for the last decade or so that we need to get this old pesticide re-registration process done, and time lines were repeatedly put into statutes, we never got the resources. FIFRA 1988 was passed by the House and Senate and signed by the President last fall, which finally gave us a road map for re-registration of old pesticides, and came up with a mechanism that will also provide the resources that we hope will be equal to the task.

Now, the time line that is involved in that process in that statute is to have it all done 9 years, 10 years, maybe if you look at the out-year process. That is the good news. We have a road map. We now seem to have a mechanism that also provides the resources to a re-registration fee to be able to help us to get the work done in that time line.

The bad news is that as we go through this process, it is inevitable that we will find some chemicals with some data that suggest we want to modify, possibly cancel, some or all uses of those pesticides, and if I have to go through the cancellation process that I described but a few years ago, I guarantee this committee that we will get stymied halfway through the process because the process is so long.

You have started us on the road map, but I am going to hit a bottleneck somewhere down the road, and I would suspect it is going to be 3 to 5 years, not just with an Alar, or a chemical, but with a variety of chemicals.

Senator ADAMS. Well, I would just close with this, Mr. Chairman. The father of my daughter-in-law poisoned boll weevils in cotton up until he died in 1962, and there is no question about it that the poisons just killed him. He took that as a risk of life. Our society has decided that that risk of life is no longer valid, and I just think these time periods are very, very long, and consumerism now is going to particularly move in food areas.

Mr. Chairman, I appreciate the time you have given me, and I hope that we can get an ability between the processors, the manu-

facturers and the users to be at a more rapid rate, and that you will give us suggestions as to how we can accomplish this.

Senator DODD. Thank you very much, Senator.

Senator Coats.

Senator COATS. Just a couple of questions, Dr. Moore, to follow up on your statement about testing multiple pesticides at the same time.

You have begun to do this, is that correct? In other words, you understand the problem. If we just test one pesticide or one potential toxic at a time, that is not going to bring about assurance to consumers or others that the product is necessarily safe. So describe for me a little bit about your procedures in multiple testing and where we are going to go on this.

Dr. MOORE. Senator, our basic requirements, the backbone of what we require, still is primarily focused on the active ingredient in a pesticide formulation that kills weeds, arrests insect growth, or whatever the case may be, as opposed to testing that plus a variety of other pesticide formulations. So the extensive data base is built on the specific pesticide. If there are mixtures of pesticides that are going to be marketed as mixtures, we require studies on those mixtures primarily for acute types of testing, assuming that chronic testing has been done on the individual pieces.

There is no question that the issue of mixtures of chemicals, whether we are talking about pesticides or any other types of chemicals, is a vexing problem. I recall an academy report that came out, I think, in the last 18 or 20 months that specifically tried to address that issue, and their wisdom was, absent a whole lot of data on the subject, that there does not seem to be evidence that would suggest that most chemicals are going to have to have some type of an additive or synergistic type of effect when they are put in combination. Those instances where we can cite where there is additivity or sometimes even antagonism are relatively modest rather than the majority of those, and they are optimistic that in those times where there were interactions, they were usually going to be additive rather than multiplicative.

An area of pesticide chemistry where we do look for additive effects is those chemicals called organophosphates which can cause acute toxicity, where we do know that the effects of whether you are exposed to A or B add together as opposed to remain separate, because we know that they attack the nervous system the same way.

Senator COATS. Were the 1988 FIFRA Amendments helpful, and will they give you a body of information that you need to better assess these risks?

Dr. MOORE. Senator, as I told the pesticide program after the President signed FIFRA 1988, the Senate and the House gave us what we said was needed to be able to get on with the re-registration process. You gave us the road map; you gave a funding mechanism that hopefully will be equivalent to the resource need to get the work done, and now the ball was in our court. It is certainly too soon to issue a report card, since it only passed in late 1988, but I am optimistic that we can get well along with the process as long as we clear out the administrative hurdles that might be attendant

to the rear end of the process that I mentioned a number of minutes ago.

Senator COATS. Did you get what you needed? Do you need more?

Dr. MOORE. Our sense is that we have what we need in order to complete the job and the task in the time line that was identified by Congress in that statute, which was 9 years. An area that could be problematic is the extensiveness of residue data that might be needed, which is why we are sitting here this morning, particularly as it relates to what are referred to as minor use crops. The economic base may not be there for the private sector to support some of the residue data on crops that just do not generate enough revenue by pesticide use to do it.

The major crops—corn, cotton, soybeans and peanuts, for example—usually can generate enough economic residue to support any data we would require. If you take that same pesticide and maybe try to translate it to kohlrabi, which has a rather modest income, it may be problematic for some of those minor crops to be able to generate the money to pay for the cost of residue studies.

Senator DODD. Just to finish up on that point, how many of the older pesticides are you getting new data on that would require this kind of review that you have described as a "bottleneck" problem?

Dr. MOORE. Probably all in the sense of the extensiveness of the data that is required. As it relates to what we refer to as the core health and safety data, most of those studies are already underway, because we put a requirement on them several years ago. But what may also be visited in the upcoming months as we implement FIFRA 1988 is that we probably required 2 or 3 years ago that you start a cancer study on mice, because we clearly require one, and there is not one in our files. We now are in the process of reviewing the cancer study that was done in rats that is in our files to find out if it is adequate by the standards of the Eighties. If our answer is no, we then would say do one in the rates as well.

Senator DODD. You talked about the bottleneck. I sense that your frustration with FIFRA helps you—the road map is there—it is in the suspension/cancellation area that you see the real problem. I would like to ask you if you have some recommendations to make in terms of legislation as to how we might tighten up that process for you; we would welcome that. Do you have such ideas? Are you drafting any amendments? Are you going to make any proposals in this area?

Dr. MOORE. Senator, I would be glad to share our point of view with you.

Senator DODD. We would be glad to receive it. I would be very helpful, in fact. I could sense the frustration in your voice as you see the particular difficulty with the time frames coming up. So we will welcome that, and in fact I would ask you to submit, if you would, to the subcommittee your suggestions, and then we will sit down and see if we can't have some discussions on how to proceed.

Dr. MOORE. Thank you.

Dr. PROTHROW-STITH. Senator Dodd, may I make a comment about the FIFRA amendments?

Senator DODD. Yes, certainly.

Dr. PROTHROW-STITH. We do find them a success and a road map and are impressed that the resources are attached. One of our concerns, however, is that they require the kind of risk-benefit weighting that we are used to doing in public health, but it implies that some cancer is worth the benefit. And one of the things that I think is important to underscore here is that the National Cancer Institute, the Occupational Safety and Health Administration and the EPA have all said that there is no safe threshold level for exposure to carcinogens.

In Massachusetts, our experience was that when we went to the pesticide board to weigh the risk and benefit, we were not able to ban Alar as a pesticide used in the State, but it was when we used the public health laws that we were able to set the tolerance levels such that an effective ban took place.

Senator DODD. Could you just tell me something—I have been told that Alar is not a pesticide. What is it if it is not a pesticide, and what is the difference between what it is and a pesticide?

Dr. PROTHROW-STITH. I think that the growers and the users will be able to speak very specifically to that. It is used for making the fruit more attractive, less attractive to insects and more attractive to people, and in one sense is absorbed by the fruit, and our expectation is that it is very similar to a pesticide.

Senator DODD. Dr. Moore, is it a pesticide?

Dr. MOORE. Based on its function, it is more of a growth promoter or growth regulator type of thing, with hormonal type of action. But as is defined by the statute, it is considered a pesticide.

Senator DODD. Dr. Young.

Dr. YOUNG. I wanted to address one thing that was mentioned, briefly——

Senator DODD. But as to the last question.

Dr. YOUNG. It is a growth promoter.

Senator DODD. A pesticide?

Dr. YOUNG. As we would look at it, unless it is put into this category there is no other way to deal with it. But it is not strictly by definition a pesticide.

Senator DODD. But for purposes of your testimony——

Dr. YOUNG. For purposes of the testimony it would be looked at as a pesticide.

Might I make a different comment, sir? I think one of the most important things that you will be addressing today, possibly without realizing it directly, is the fact of the increased growth of chemical sophistication.

When the Delaney Clause was passed, we could detect about one part per thousand to one part per ten thousand. We can now routinely in certain compounds detect down to the parts per billion and even parts per trillion.

The question that this Congress and the American people are going to have to face is what do we do when we get now closer and closer to the gram molecular weight—that is, the weight of a particular molecule. And we are about 1 million to 10 million away from that. We are going to be finding a lot of compounds in food that, if given as we test them appropriately, to the maximum tolerated dose, are going to produce cancers. And the number will increase.

The issue will be: Is there some way to look at a level of which the risk is essentially de minimis? That has to be joined as an issue. That is an issue for the Congress to look at. But latent in a lot of the statements that are here is that whole issue, and to not address that squarely would be missing what I think is the heart.

Senator DODD. I think that is a very good point, and I appreciate your making it.

Senator Harkin.

Senator HARKIN. Thank you, Mr. Chairman.

I just want to say that I was one of those who watched the "60 Minutes" program here a couple of weeks ago. Having two young daughters and also having served on the agriculture committees now for 14 years around here, it again renewed my interest in this area of the whole re-registration of pesticides and taking a look at them.

After I watched that program, something clicked in my mind. I remembered back a few years ago that EPA began a special review of daminozide back in 1980. So I had my staff look into it; I said I kind of remember that. Well, what we found was that, as best we could determine, there were some private negotiations, closed door negotiations, between EPA and Uniroyal, and after that EPA dropped the special review.

Do you know anything about that?

Dr. MOORE. Senator, I think your recollection is historically correct based on what I am told. I did not join EPA until 1983; I put it back into special review.

Senator HARKIN. Oh, you put it back in—but it was dropped as a special review.

Dr. MOORE. I do not know if it was formally dropped, but it certainly was a point of discussion back in 1980–81 and for whatever reason languished for a period of several years.

Senator HARKIN. Do you have any internal documents in your agency showing a closed door meeting with Uniroyal, discussing this special review of daminozide?

Dr. MOORE. Senator, I do not know. I would be glad to have the files looked at and provide it should we find such a thing.

Senator HARKIN. Would you search your files, and if you find such internal documents, I would like to know if any minutes of that meeting were kept, what the discussion was about, and what decisions were made after that meeting to take that off the docket of a special review.

And you are right that EPA began another special review in 1984. At least, that is what my notes tell me. And in 1985, as a result of the special review, EPA announced it intended to cancel use of daminozide on food crops on the basis of animal studies.

Is that correct?

Dr. MOORE. [Nodding head.]

Senator HARKIN. And then, late in 1985, EPA's Scientific Advisory Panel concluded that the evidence against daminozide was insufficient. And in January of 1986, EPA backed away from the decision to cancel use of daminozide and started to collect more data.

Why was that decision made? You initiated, you said, another special review in 1984; in 1985, you announced that you intended to cancel the use of daminozide; but then, in January of 1986, you

backed away from that decision and said you were going to collect more data.

Dr. MOORE. Senator, your timing is correct. There were a number of studies that had been done in previous years, in several different laboratories, that indicated the daminozide or UDMH—which is a contaminant and a breakdown product of daminozide—may be a carcinogen.

We looked at those studies, and we found that each one of those studies were flawed; we had some serious reservations about them. We even audited some of those studies to see what the quality of the data was. Our estimate, the program's estimate was that despite the flaws in each and every one of those studies, the composite of those several studies allowed one to make a qualitative judgment that indeed there was a cancer causality concern associated with UDMH particularly in production of tumors in mice.

But we did not formally propose to cancel. Under the statute, we must submit any actions of that sort to an independent group of scientists, who reviewed the data, who reviewed the basis of our proposed action, and strongly advised us that the data was flawed to a greater extent than maybe we were willing to concede and advised not moving forward on the basis of that data. And while granted, they are advisory, we heed advice of that sort, and in this case elected to hold in abeyance, if you will, our proposed action based on their comments and demanded new studies be commenced.

There have been new studies on daminozide in rats and mice, and new studies in UDMH still ongoing. It was the basis of the new studies that led us in late January to propose that we move forward once again with the cancellation of daminozide, based on the early indications of tumor response in mice.

Senator HARKIN. That raises two questions in my mind. First of all, are you saying the studies are irrelevant—because in 1985 you wanted to ban Alar. At that time, you then decided against a ban because of questions about the studies that you said the scientists raised. Does that mean the studies are irrelevant?

Dr. MOORE. My choice of term would not be "irrelevant", Senator. I think——

Senator HARKIN. "Fraud"?

Dr. MOORE. Well, when somebody says, hey, we think the studies are sufficiently flawed that the judgment you want to reach may be wrong with a high degree of probability, we then said that we would not take action based on that type of a problem.

The studies assumed poignancy in 1989 and renewed relevance because new studies, presumably without any of the flaws of the old studies, are indicating the same tumor type in mice. They now take on great relevance.

Dr. PROTHROW-STITH. Senator Harkin, in Massachusetts we had to take a look at that in order to look at the 1986 proposal to set tolerance levels. We agreed that the studies were flawed, but were quite impressed with the number of tumors in a number of different species and the size of the tumors. And with that, plus the structure of chemicals being similar to known carcinogens, we felt that was enough to at least begin to reduce the levels in the food, and that is where we moved to test the tolerance levels. But the

flawed studies were generally agreed upon in terms of the kinds of flaws that they have. Although some of the methodology represents standard protocol methodology, it would not meet the current EPA standards.

Senator HARKIN. Let me cut through all that. On the basis of the studies, Massachusetts decided to reduce the amount of Alar that could be used.

Dr. PROTHROW-STITH. Right.

Senator HARKIN. On the basis of the same studies, EPA decided to not restrict its use at all—that is basically what we come down to, right?

Dr. MOORE. On net.

Senator HARKIN. OK. The second part of my question is who are the scientists that reviewed the data for you? These are not internal scientists at EPA?

Dr. MOORE. Well, obviously, there are two sets of analyses that were done, one by agency scientists that led to the determination that we thought in the composite those flawed studies had meaning. It was their judgment, and then the other verbiage that would be associated with that, which then is put forward in a document which then is reviewed by an independent science advisory panel. The statute says that we must select members of those panels from names submitted to us from the National Institutes of Health or the National Science Foundation. They typically serve 3 and 4 years, so over time, you end up with different people, but they are independent scientists, essentially drawn from academia.

Senator HARKIN. Could some of those scientists also be doing research for some of the companies that make these pesticides?

Dr. MOORE. It is conceivable. Anybody who——

Senator HARKIN. Have you ever checked that out?

Dr. MOORE. Senator, any person who serves on that science advisory panel or any of our other scientific advisory boards basically is conferred the status of a consultant to the agency in a legal sense, and as part of their appointment papers, must file with us financial disclosure statements. So indeed, if Dr. "X" had been doing work for company "Y", if it at least were current, we would pick that up on that financial disclosure statement. I am not sure we would pick up if he had done it 20 years ago.

Senator DODD. What about Uniroyal? Are any of them working for Uniroyal?

Dr. MOORE. Not to my knowledge.

Senator HARKIN. So that was reviewed; you can assure us that that was reviewed, and the scientists who reviewed this would not have been at that time doing any consulting work or receiving any remuneration at all from the manufacturers?

Dr. MOORE. To the best of my knowledge—I again will recheck, but to the best of my knowledge, that's correct.

Senator HARKIN. OK. I hate to take any longer——

Senator DODD. Oh, no. I appreciate it.

Senator HARKIN. But I have served on the agriculture committee for 14 years, trying to get FIFRA modified. Just for the record—maybe this was asked earlier, but just for the record--how many pesticides are in use in America today?

Dr. MOORE. Senator, we estimate that there are about 600 active ingredients, discrete pesticidal products, about 300 of which are used on food-producing crops.

Senator HARKIN. Three hundred different pesticides.

Dr. MOORE. Right. There are 50,000 pesticide registrations, ranging from "me-toos" of the same product or mixtures of some of those products.

Senator HARKIN. That is what I am talking about.

Dr. MOORE. But the basic chemicals are 600, 300 of which are on food-use products.

Senator HARKIN. There are 50,000 registered.

Dr. MOORE. Registrations, yes, or licenses, so to speak.

Senator HARKIN. How many of those 50,000 have been reviewed and tested?

Dr. MOORE. Well, all of them have been reviewed and tested based on the standards that were extant at the time they were proposed. As far as the standards of the Eighties are concerned, I would say that we are probably in the range of 120 to 150. How I come by that number is that we register about 12 new active ingredients a year. The requirements of the Eighties, 8 years times 12, would give us 96, and I would say there are another 4 to 5 dozen who maybe do not have all studies in, but have the majority of the studies in one form or another.

Senator HARKIN. You would agree, would you not, that many of these that were registered many years ago were registered under old criteria.

Dr. MOORE. Yes, sir.

Senator HARKIN. They have not been looked at in light of the new kind of scientific analysis that we are capable of performing.

Dr. MOORE. You are correct.

Senator HARKIN. And that is what really needs to be done.

Dr. MOORE. Yes, sir.

Senator HARKIN. My last question, Mr. Chairman, and I promise this will be my last one.

We focus a lot on the 300 or 600 different elements that you are talking about that are active ingredients. One of the problems we have, Mr. Chairman, is that in registration and use of pesticides, in some cases—and you correct me if I am wrong on this, Dr. Moore—but in some cases, something that is banned as an active ingredient can then be used as an inert ingredient in another pesticide. Do I make myself clear? We can ban something as an active ingredient, and it then shows up as an inert ingredient in another pesticide. Is that so?

Dr. MOORE. That can be the practice, was the practice. It is a practice that is discouraged now. I think the number of chemicals that might fit that criteria probably are a handful at best today, because of the requirements we put on a chemical like that.

But what you are bringing up is the issue of inerts.

Senator HARKIN. Inerts; that is the question I am bring up. Everyone is focusing on the 300 to 600, but what is being done to focus on the long-term effects of the inert ingredients that are used as the carriers of these pesticides?

Dr. MOORE. Senator, while there are 600 active ingredients, our estimates are there are somewhere around 1,200 inerts, so to speak,

which are chemicals that are in the formulation not because they kill a bug, but they are there as a vehicle to make it stick, or for any one of the variety of reasons.

We broke those inerts down into three major groups about 3 or 4 years ago, a small group being that, based on what we know, we would almost put them in the category as generally regarded as "safe"—realizing that that is a term that FDA coined, that based on what we know of those chemicals, there is probably no need for concern. There were, as I recall, around 100, 150 in that category.

There was also a category of 100 or so chemicals, as my memory serves me, that we said had toxicity data that would lead us to be of concern; and then the vast majority fit somewhere in between because there is not a whole lot of data to allow you to make an informed judgment one way or the other.

We identified 50 of those concerned chemicals or concerned inerts as our priority. As resources are available, we are trying to get those chemicals out of formulations. It certainly does not get the priority that we put on the re-registration of the active ingredient.

There was legislation introduced as part of the FIFRA reauthorization that was not part of the FIFRA 1988 Amendments that did pass that would give us greater specificity and maybe would also facilitate our ability to move against some of those inerts when we request that they be taken out of formulation, but somebody is reluctant to do so.

Senator HARKIN. I just think it is a scandal that EPA will ban the use of a certain chemical, pesticide, and then turn around and it is used as an inert, unbeknownst to the public, and is listed on the can or the box or whatever it might be as an inert ingredient. I just think that is a scandal that has to be stopped.

But all of this re-registration—we can go through the whole FIFRA discussion, and I do not mean to do that here because we don't have the time—but that one aspect of getting into the inerts is one thing not too many people have focused on, Mr. Chairman.

Thank you.

Senator DODD. Thank you, Senator Harkin.

Senator Harkin has raised a couple of questions as to some data, and we would appreciate it if that information could be made available to the committee.

Tom, earlier I had proposed to Dr. Moore some legislative ideas dealing with the cancellation and suspension process. Maybe it would be worthwhile if simultaneously you could give us some of your ideas on how we deal with the very issue Senator Harkin has just raised dealing with the inerts in this area as well. That could be helpful in terms of looking at the legislative package, which I know is going to be moving along.

Thank you, Tom, very, very much. Those lines of questions were very helpful.

Very quickly, Dr. Young—we have taken a lot of time, and we have witnesses sitting in the audience who are losing patience, I think——

Dr. YOUNG. There is only one safety net, Senator, and that is that there is what is called the "total diet study", where you analyze meals, and that has been over 20 years in duration. If some-

thing was taken off as a pesticide and appeared as an inert and was still within the total diet study, you would pick that up and be able to provide that information to EPA. So there is a comprehensive system to determine exactly what pesticides of the ones that we look at are in the diet, and those are the high-risk ones. There is that safety net that gives information to EPA.

Senator DODD. I want to personally thank all three of you. You have been very, very helpful, and we look forward to hearing from you shortly on some of these specific requests for information. You are very gracious to come before the committee, and we thank you very much.

Our next witnesses, like several of the witnesses today, are constituents of mine. This could be called "Connecticut Day". Uniroyal, as I have mentioned earlier, is a good corporate citizen in the State of Connecticut, and we are going to be hearing from them shortly. But our next witness is Ms. Meryl Streep, who is the chairperson of Mothers and Others for Pesticide Limits, the educational arm of the Natural Resources Defense Council.

Let me first of all welcome you to the subcommittee and to the Senate and express to you, as your Senator, at least part-time anyway, that I think what you and others have done with this issue, raising a level of concern, and trying to educate people, is an extremely valuable contribution, and I would associate my remarks with those of Congressman Sikorski in commending you for stepping forward and getting involved in an issue that we already know is a highly controversial one. But it is, I think, helpful, and we hope that these hearings will be helpful in trying to at least sort out some of the questions that people should be focused on. But most importantly during this process, clearly, there are some things that, while Government is deciding what to do, average citizens can do, and this morning you are going to address that particular subject. So again, I thank you for being here, and we are glad to receive your testimony.

STATEMENT OF MS. MERYL STREEP, CHAIRWOMAN, MOTHERS AND OTHERS FOR PESTICIDE LIMITS

Ms. STREEP. Thank you very much.

First of all, I would like to introduce my cadre here. This is Sharon Tingley; Roberta Willis, who is chairman of my local group of Mothers and Others; and Susan Rand.

We are here because of that NRDC study that looked at the effects of pesticides in the diets of children from 1 to 6 years of age. Just to reiterate, that study said that because of the higher rates of consumption of fruits and vegetables by children from 1 to 6, that they were getting higher doses of pesticide residues, and that they were getting it at a time in their lives when they were least able to resist the assault of toxins.

According to the study, 55 percent of the cancer risk, lifetime cancer risk for exposure to pesticides, was incurred in the first 6 years of life.

What disturbs me a little bit about listening to all the testimony is that even now, right now, we do not know what is on our food. We do not know if it is very dangerous, we do not know if it is a

little bit dangerous, we do not know if it is dangerous only to infants and small children, and we do not know, really, if the economic benefits outweigh the small, perhaps, number of small children who will eventually be damaged or maybe die as a result of yearly exposures to the levels they now encounter.

I just had my picture taken for a magazine, and the makeup woman who was doing me knew that I was involved in this issue, and she said, "You know, this is making me crazy. I don't know what to do. My kid is 3, and she eats a lot of apples, apple products, apple juice, all day long she drinks this. And I am very concerned, because I went to the store, and I don't know what has Alar on it and what doesn't."

We have all seen the signs that say "Alar-free"—but they don't have a sign anywhere saying, "We've got it; come on down." So there is no way to tell.

So she said, "What I'm going to do is I am going to get my kid off apple juice for a while and I am going to move on."

I said, "That sounds good."

She said, "I called up Dole."

I said, "You called Senator Dole?"

She said, "No—I called Dole Pineapple. And they had a consumer lady who talked to me. And I said, 'Do you have this thing that they put on the apples?' and she said, 'No, no, no, no, no. We don't have daminozide on pineapples. We can assure you that we do not use Alar on pineapples.' "

And so my friend said, "OK, so what do you use? Hello?"

And she said, "You don't use Alar on the pineapples. Maybe you could tell me what you do use. Can you tell me?"

And the woman said, "No."

And my friend said, "Well, why not?"

"Well, we are not able to give that information."

This was last week that this happened. Are we not allowed to know what is on the food? That is what is so distressing. When we go to the store, we are confronted with an array of colors, mainly, and everything looks the same. We do not know where it came from, and we do not know what is on it. I think we should be allowed to know what we put in our mouths and what we put in our children's mouths.

Some of the scientists and agency and industry people who have been talking have known about Alar for years. Well, it's news to me.

Anyway, I am concerned by the sort of confusion about how much is actually out there—whether it is 5 percent—I guess that figure was taken from an informal phone survey with farmers by the EPA—whether it is 10 percent, according to the FDA; or whether it is up to 60 percent, as was found by the Consumers' Union in a market basket survey of apple products.

I think the reason we have all been invited here, as I look around the room and I see so many experts, is we have been invited for what we do not know, which probably will fill the room. But actually, I do not mind representing the constituency of the great mass of uninformed, because I think what we do not know about this issue is the most alarming, and that is coming up over and

over in what I have been hearing. What we don't know is a frightening chasm.

And there is a reason why mothers are concerned across the country. In recent weeks, we have heard the experts on either side, wrestling with statistics and numbers. Those in whose economic interest it is to say everything is okay say everything is okay. On the other side are reputable scientists, doctors, health professionals who say yes, there is real cause for concern, there is a danger posed to children from pesticide residues.

I read in the paper I think it was only last year that the EPA said that pesticide residues in food were one of the top three hazards to the American public. Then, when this report came out, everyone said that the food supply was safe. I really do not know who to believe.

My friend, Susan, got a letter from the FDA last week, saying that there was absolutely no cancer risk posed by pesticide residues in food whatsoever. So they are having a fight, EPA and FDA.

What's a mother to do? What a mother does when confronted with this kind of conflicting evidence is get very, very conservative, very, very careful. As consumers, we lose all confidence in the products that we are buying. As citizens, we lose complete confidence in and patience with the agencies whose sole purpose is to protect us. And as parents, we lose it completely, our temper, when these numbers are bandied back and forth for years and years and years, while our children grow from babies to toddlers to taller children to teenagers, and they continue eating the same foods, grown in the same fields, sprayed by the stuff that you guys are fighting about in Washington for 19 years. And now we have maybe three more to go with Alar and nine more to go with these other unknowns.

Parents and consumers are, I do not think, going to wait; and I think they are sending that message to you.

As I said, I am here because of what we do not know, and so I am going to reopen some of these gaps in our understanding. I do know that in 1972, Congress did pass legislation that said all these 300 pesticides, these old pesticides that were introduced before we had the science to make the connection between cancer and pesticide use, neurotoxic damage and pesticide use, and reproductive dysfunction, now we have the science, and we must look at those substances quickly and judiciously.

That was 17 years ago, and as you have heard, a handful have been investigated for the full range of their health effects. So when they tell us that the food supply is safe, my question is how do they know, if none of these things have been tested.

I know from FDA's own literature that the testing methods—and they have gone over this already; it is a litany; I feel like it is the Mass; we cannot repeat it enough—the FDA's standard routine monitoring systems only pick up, I heard, 40 percent of pesticide residues that are currently on food. So I guess today they use their intuition to decide whether the other 60 percent of residues are safe and at safe levels.

But when they tell me that the food supply is safe, it does not sound like it is based on hard evidence.

Incidentally, I have three children; my son 9, and my daughters, 5 and 2 years old. Two of their favorite foods—and I spooned it into their mouths from the time they were 4 months old—were mashed bananas and applesauce.

Bananas have benamyl in them, another systemic pesticide; you cannot peel it, wash it, or scrape it off. Apples have—at least when I was feeding my toddlers—daminozide, or UDMH, which cannot be washed off.

So I am concerned about this, and I am concerned because two of my kids are almost past the age where the NRDC says the cancer risk is incurred.

I also understand that pesticides banned in this country continue to be manufactured in this country and sold abroad. They are sprayed on the fields, on crops, that are then harvested and sold back to us, and we get the residues of those banned pesticides on the skin and in the flesh of the fruits and vegetables we buy out of season.

FDA monitors, you heard him say, less than one percent of those foods, anyway. So that when they tell us the food supply is safe, how do they know?

Now, one side in this controversy will say, "Where are the bodies? There is no epidemic of cancer in this country." But you know, according to the National Cancer Institute, since 1950 certain cancers are on the rise—breast cancer, prostate cancer, testicular cancer, stomach cancer, non-Hodgkins lymphoma, which is a cancer that has already been linked to pesticide exposure, leukemia, and all childhood cancers—on the rise since 1950.

Why? What are we doing differently than we did before? I would just offer that all the longevity claims in this country and all the great good health that our grandparents and parents enjoy, when they were 1 to 6 years old they ate nothing but organic food, because there was no other kind of food.

Right now, since the Second World War, most of the things that I ate, I am sure, as a kid, and I know pretty assuredly that every single thing I gave my kids up until this August when I read the report, was sprayed with something.

I just no longer wish my children to be part of this experiment to see what the health risks into the next century are going to be from these exposures that are relatively new in the food supply, new since the Second World War. That is why the group that we have founded has gathered to its national organization mothers and other people who care about children and who are experts on their behalf. We have included on our board Richard Rivlin, who is the Chief of Nutrition at Memorial Sloan Kettering Cancer Center; T. Berry Brazelton, a pediatrician; Manya Unger and the National PTA; Julie Nixon Eisenhower; Dr. Herbert Needleman and the American Academy of Pediatrics; Theresa Hynes; Mrs. George Rubely and the Garden Clubs of America; Iris Shannon and the American Public Health Association, and a lot of other people that I have not mentioned, because I am going to miss my plane.

But this is not an hysterical outcry from people who are just uninformed. There are a lot of very well-informed and distinguished Americans who are concerned about this problem. We would really like to see these EPA tolerances reset to protect at basis infants,

the most vulnerable members of our society, and quickly, and money allocated to that end.

We would also like to demand incentives and financial assistance and educational networking made available to farmers who wish to make the transition to low-input sustainable agriculture, because that may be the wave of the future.

That is basically all I have to say, except there is one other thing. In the *New York Times*, Professor Prokopi, a professor at the University of Massachusetts, said that in 1945 crop loss due to insect and pest damage was about 30 to 32 percent. In 1980, after we increased the use of pesticides 10-fold, the crop loss due to pest damage and insects was 37 percent. So, what the heck are we doing with these things?

If we are just creating bigger and better bugs, and if the price is a walk down a hospital corridor with someone we love at some point, I don't think it is worth it.

I would like to thank you very much for letting us come.

Senator DODD. Thank you very much.

Do either of your associates have any comments you would like to make?

Ms. STREEP. They were supposed to hold my hand—but they didn't.

Senator DODD. They didn't need to at all. You did an excellent job.

You mentioned a couple of things you would like to see done in terms of resources and with those people as I described who are caught in the middle of this—the producer, the processor, and obviously the consumer, who has to rely on everything here to know what they are getting.

But what would you recommend in the short term—obviously, some of the things you have suggested are more long-term, realistically speaking. What would you like to see the EPA do, the administration and the Congress do, the producer do, in this particular case?

Ms. STREEP. Do you mean in the case of Alar?

Senator DODD. Yes.

Ms. STREEP. Well, I cannot figure out if they can suspend it—you know, my dad worked in the pharmaceutical industry, and before they put something out, they had to test and make sure it was safe, and then it was allowed to go on the market. This is a little backwards.

So I think if there is a way to suspend it, that should be done; and when it is proven safe, and everyone is thrilled, it can be rereleased into the food supply. But meanwhile, while it is being tested, I think that there should be really strict monitoring of the residues. As I said, FDA cannot even pick it up in their regular, routine testing; they do not even pick it up.

Senator DODD. I think to some degree, because of this one particular product and this one particular subject—your concern goes far beyond the issue of apples and apple juice and applesauce.

Ms. STREEP. Yes. I think it is unfortunate that we have centered on one group of growers. I know that they have been reading the literature, as I have, from the Uniroyal Company, saying that there is absolutely no—none—evidence that says that this is a car-

cinogen. And we have scientists lined up down the road saying that it is.

Senator DODD. Senator Harkin.

Senator HARKIN. Thank you very much, Mr. Chairman.

Ms. Streep, I want to thank you for being here and for your testimony. I want to commend you and your nationwide group on your efforts to bring attention to the safety of our children's food. It is commendable.

There are those who think that this is hysteria—you have addressed that, that it is not hysteria, that it is based upon facts.

There is one question I do want to ask you, and that is, as someone who represents a great number of farmers, as I do, sometimes they are caught in a bind; they are really caught. And you addressed that very briefly at the end when you talked about getting help for low-input sustainable agriculture.

Ms. STREEP. Yes. Right now, I think one-tenth of one percent of the agriculture budget, research, goes into that. I think it is $4.4 million, or something like that. What if that were flipped over? What if 99 percent of the budget went into that research? That would be nice. The food supply would sure change, and these unknowns would disappear.

Senator HARKIN. Let me just ask you a very personal question. I have been contacted by the Iowa Farm Bureau. They are in town today. Would you be willing to meet with some farm families and talk to them?

Senator DODD. She has got a plane to catch at 1:30 p.m.

Senator HARKIN. Not today, but I mean at any time.

Ms. STREEP. Yes, I would love to, as a matter of fact, yes.

Senator HARKIN. Would you come out and meet with some farm families?

Ms. STREEP. Yes, absolutely.

Senator HARKIN. They are parents, also.

Ms. STREEP. Yes, and they are also most at risk from a lot of these things in terms of groundwater contamination; absolutely.

Senator HARKIN. Very much so. And I would hope that your organization would reach out to farm families and begin to——

Ms. STREEP. We have several farmers on our board of directors. We have Dick and Sharon Thompson; Jerry Holtzapple.

Senator HARKIN. Dick Thompson is a good friend of mine.

Ms. STREEP. Great. And I forget the other ones, but a huge list, huge.

Senator HARKIN. I just wanted to make that point, because I don't think you will find that farm families are enemies——

Ms. STREEP. Oh, gosh, no. I am really sad that we have been perceived like that. Frankly, I feel like the messenger who got kicked with the news. You know, we didn't make this up. I am sure they join us in those concerns. In fact, my new reading includes the *Kiplinger Agriculture Newsletter* and *New Farm Magazine*, and all these various things that tell me farmers are very, very interested in this.

And in fact, in our own State of Connecticut, the Integrated Pest Management Program is going to go under this year. Right at the moment when concern for this is reaching its apogee, they are not

going to be able to make it. And in Connecticut, 45 percent of our dairy farms have disappeared in 7 years.

We live in a rural area; we are very interested in saving farms. Actually, in terms of the small family farm, low-input sustainable agriculture, rotating crops is a very viable way for them to proceed.

Senator HARKIN. I agree with you entirely, and I am pleased that you are reaching out and talking to farmers.

Ms. STREEP. Oh, yes. I mean, in my garden, everything dies, so I am not great on growing practices.

Senator HARKIN. Thank you for your concern. I just want you also to know that after I watched that program—my kids drink apple juice all the time—and I got my staffer and I asked is there anyplace you can buy apple juice that is certified that it is made from apples that were not sprayed—and yes, there is. You can buy that stuff; it is on the market.

Ms. STREEP. Yes, we got it in our town.

Senator HARKIN. Sure. So I am just saying the demand pull now is going to start creating more and more of these kinds of products.

Ms. STREEP. Unfortunately, now it is a specialty item; only 3 percent of the farms grow organically at the moment. And some of Senator Fowler's suggestions in his farm bill were really good, I thought, in terms of putting farmers in touch with each other, because you know, the extension services of the universities have not pushed this kind of agriculture.

In our State again, in Connecticut, I sent for a brochure from my extension service, I think it was called, "Looking at Organic Gardening." And it was four pages of why you shouldn't really do it and why it was not economically feasible except for the smallest garden plot. And that is just an outdated notion.

Actually, what is interesting to me is that, in talking to growers as I have, traditional methods of farming has come to mean chemical farming, and I think that is a bit of semantic wizardry—I thought they were talking about what my grandpa did, but it is not at all.

So I think there are people with better statistics in their pockets about the viability of sustainable low-input agriculture, integrated pest management. I am not the person to talk about that, but I know I support it.

Senator HARKIN. There is a difference between, obviously, growing apples, fruits and vegetables and the kind of farming that is prevalent out my way where we grow mainly feed corn, soybeans, wheat——

Ms. STREEP. Well, the Thompsons do, yes.

Senator HARKIN. They do, and they have proven that they have been very successful at doing it, too. You cannot argue with that; they have been very successful. Although I think, again, if you talked to Dick and Sharon for some time you would find that in the early days when they started doing this, had he not had the economic wherewithal to sustain it, he might have been out of farming. But they pushed through those early years, and now they are okay.

I will just repeat to you what a farmer said to me a dozen or so years ago; I will never forget it. We were talking about this very subject and he said, "You know, I feel like a dope addict. I have got

to put on the chemicals; I have got to keep putting them on to get the kind of yields I need to make the money I need to feed and clothe and provide for my family. And if I go off of them, I am going to lose all that money, and we are going to go broke. So you see, I am kind of caught in this circle, and I cannot break out of it."

What he was asking for was Government help and information and that kind of thing to get him into that.

Ms. STREEP. That's right. And in the last 10 years, the number of insects and pests that have become immune to these substances that we are now putting on crops has doubled, just in 10 years. If things grow exponentially that way, we are mortgaging ourselves to a future where the soil is desiccated, because it relies on chemical fertilizer and——

Senator HARKIN. And water.

Ms. STREEP [continuing.] Yes, and water.

Anyway, thank you very much.

Senator DODD. Thank you. As you point out, in Connecticut we have tried over the years, through these purchasing development rights, because of the value of land in our State, as you know, particularly out where you live—it has skyrocketed to such a degree that trying to keep farms is very, very difficult.

Joe Lieberman, my colleague from Connecticut, is here, and he, while not a member of the committee, I know has some interest in the subject matter and was interested in asking a couple of questions. Joe, we welcome you.

Senator LIEBERMAN. Thank you, Mr. Chairman, and my dear friend and colleague from Connecticut. Thanks for allowing me to come and say hello.

First, Ms. Streep, I just want to welcome you as your other Senator and tell you that we have all been very proud to have you living in Connecticut because of your extraordinary gifts as an actress, but I must say that I am prouder than I have ever been listening to you today, because of the leadership you are showing on this issue, which is absolutely unnecessary for you. You do not need, in terms of your life, to do it. And because of what you have done, I think you are going to make a difference here.

You said you were uninformed, but let me just suggest to you, as I think you did yourself, that the questions you are asking are the ones that everybody is asking all across America, and they are in fact just the questions that we must be asking and that we must be coming up with answers for.

This episode suggests the broader problem that I think our society has, which is that we have organized ourselves in a way, technologically, chemically, where we are living a very sophisticated life, but we are in danger of turning a world over to our kids which is apparently comfortable, but is ultimately, unsafe, and at worst, uninhabitable.

So this is a cutting issue, because it is clear to everybody now, because we all eat, and we worry about what is on the food, and we want to have some more confidence about what is there. So you are right; I would rather, to use a trite old express, be safe than sorry.

I have a 1-year-old baby girl—1 year yesterday—and like probably millions of other people in America, we tore that apple juice

off the shelf in the last couple of weeks. And I am not going to put it back, I am not going to put it into those bottles for her, nor is my wife, until we have some confidence about what is going on.

I want to ask you two brief questions. I unfortunately had to go out to another meeting, and I did not hear Dr. Moore, and he may have answered this. But in your work, are you satisfied—because the testing on pesticides, as you say, is totally inadequate in terms of the numbers covered, but also I worry about the content—are you satisfied that the tests that are being done properly allow for the special vulnerabilities of children because of their body weight and less-developed immune systems?

Ms. STREEP. Not at the present time. And from what I understand, Dr. Moore said that they presently do take that into account. But that is a relatively new development; and yes, there are stringent requirements for the introduction of new pesticides. So as a result, most of the pesticides currently used on food were introduced before we had the science to ever make the connection between health risks and the substances. That is actually true.

Senator LIEBERMAN. Am I correct, and do you understand that even on the pesticides that have been checked and approved, that the level of tolerance is basically an adult level of tolerance?

Ms. STREEP. That is right. A lot of them are based on what an 18 year-old, 160-pound male ate in 1960—and even he eats differently today, because of the National Academy of Sciences and everybody else who tell us we should eat fresh fruits and vegetables, and we should. So as parents, we are in a bind.

Senator LIEBERMAN. The second question—to your knowledge, has any work been done on the combined effect of different pesticides on our bodies? In other words, just like you, we have been giving our baby both bananas and applesauce. Now, those are two different chemicals in each of those. Is there any work being done—and I am asking a layman's question—on that?

Ms. STREEP. I think that he addressed that; that in certain cases, with certain organophosphates, they look at sort of the contextual situation in which an organophosphate may act with another. But actually, this is a new realization for me having been involved with this for 4 months. I just figured that out last week, that the way these pesticides are regulated is in isolation from each other. It is the point that we are making; it is that we cannot see the forest for the tree. We look at each one as if it is standing in a field alone and that is the only thing we eat.

So in the case of daminozide, and we are looking at 5,500 to 6,200 cancers, that is just from this alone in the field. That is assuming everything else you eat is pure. That's crazy.

Senator LIEBERMAN. Absolutely.

Thanks very much for coming. Thanks for what you are doing.

Senator DODD. Thank you again, Ms. Streep.

Ms. STREEP. Thank you. I appreciate it.

Senator DODD. If you want to come out this way here, we'll get you to your plane.

Ms. STREEP. Great.

Senator DODD. Thank you very much.

We welcome our third panel, which includes: Mr. James Wylie, vice president of Uniroyal Chemical Company, Middlebury, CT;

Janet Hathaway, counsel for the Natural Resources Defense Council; and Dr. Richard Jackson, pediatrician and toxicologist, and chairman of the Committee on Environmental Hazards, American Academy of Pediatrics.

Senator Adams is going to take over here for a few minutes. I have a meeting at the White House that has been scheduled for about 2 weeks, and I thought we would be through by this point. I apologize for the length that this has gone on. I will be back as quickly as possible, but this subcommittee will be in very good hands with Senator Adams.

I want to thank you, Mr. Wylie, for being here, and I hope it was helpful to be here this morning to listen to a lot of these things. It gives you an opportunity to hear some of these things, rather than coming on first, in some cases; you get a chance to pick up on some of the comments that have been made. But we are delighted to have you here this morning and thought it was very important that you be here, since you are the only producer, I gather, of this particular product.

And Janet, we thank you for coming down in behalf of the Natural Resources Defense Council; and of course, Dr. Jackson, as well.

I will turn the committee over to Senator Adams at this point and I will get back as quickly as I can

Thank you.

[Senator Adams assumes the Chair.]

Senator ADAMS [presiding]. Thank you all very much for coming. Both Chris and I apologize for being in and out of the room. There are three Appropriations Committee hearings going on this morning; two subcommittees from this full committee; a special meeting of the Ethics Committee; and there is now a Democratic Caucus on the agenda of the party for the next year.

So it is not a matter of disrespect; it is a matter that we are trying very hard to deal with a very important problem in a very reasoned way. I appreciate all of you waiting this long.

If you wish to submit statements, I will make an order at this point that your statements will appear in full in the record as if given, and you can summarize them. If you wish to read them, that is perfectly acceptable with the chair, also.

I will proceed through and have each of you give your testimony first, and then we will proceed to questions. And since I know there are differing interests in the panel, I will try very hard in the interest of fairness to recognize you if you feel that you wish to comment on something that someone else on the panel has done.

This is a little unusual, but I have been at this business for 25 years, and the most important thing is that we have a fair presentation. And since this is an unusual panel, if you will raise your hand if there has been some other comment, I will come back; I know that is not usually done.

The only thing I would ask is if you can make your comments and your answers as short and succinct as possible and submit for the record as many things as you can in documentary form, we would appreciate it, because we have another panel after this, and we have the impeachment of Judge Hastings at 2 o'clock.

Now, I am all yours. I'll tell you what, Dr. Jackson, you are sitting in the middle between people who may have differing view points—they may not—so why don't we start with you.

Dr. Jackson, you are recognized, and we appreciate very much your being here this morning.

STATEMENTS OF DR. RICHARD JACKSON, PEDIATRICIAN/TOXICOLOGIST, AND CHAIRMAN, COMMITTEE ON ENVIRONMENTAL HAZARDS, AMERICAN ACADEMY OF PEDIATRICS; JAMES A. WYLIE, JR., VICE PRESIDENT, UNIROYAL CHEMICAL COMPANY, MIDDLEBURY, CT, AND JANET S. HATHAWAY, COUNSEL, NATURAL RESOURCES DEFENSE COUNCIL, NEW YORK, NY, ACCOMPANIED BY AL MEYERHOFF, NRDC SENIOR ATTORNEY

Dr. JACKSON. Thank you, Senator.

I ask that the Academy of Pediatrics full statement be submitted for the record, and I will summarize my remarks.

Senator ADAMS. Without objection, it will be so ordered.

Dr. JACKSON. I am chairman of the Committee of Environmental Hazards for the American Academy of Pediatrics. I am a pediatrician and an epidemiologist and have experience in occupational health, environmental health and pesticides.

I have been asked by the academy to testify on the effects of pesticides residues in the diets of children, but the focus of my remarks will be on daminozide, since this is the chemical that has generated most of the questions from parents to my fellow pediatricians.

The Academy of Pediatrics has long supported the need to identify the data gaps on pesticide toxicity, particularly in terms of reproductive effects and possible long-term cancer hazards. As hazards to fetuses and children are identified in new studies intended to fill important data gaps, the EPA should take prompt and appropriate action to eliminate such hazards. To date the EPA has been slow in taking this action.

I think these delays are in part due to the nature of FIFRA, which requires the weighing of risks and benefits before action can be taken and a feeling that really the risk side needs to be better articulated, at least equal to that of the benefit side.

Also, I think EPA has been hampered because in certain circumstances EPA has been required to buy back pesticides that they have had to ban under urgency circumstances.

The academy feels that the NRDC report has completed an important first step in a complicated risk assessment process. We do concur with technical aspects of the NRDC report and support the goals of this report. Again, we support the policy decisions that are protective of children's health.

I have a long statement here about the whole decision process about daminozide, which really has been gone through by other speakers. But I would like to say that in terms of the Scientific Advisory Panel, members of the academy were very disappointed that no one on that panel had any experience in child health, in public health, and to my knowledge, there really was no one with knowledge of epidemiology.

Because of that, in 1986 the Academy of Pediatrics submitted written comments to the Environmental Protection Agency, Mr. Thomas, regarding the hazards of daminozide to children, and recommended that the product not be used on foods eaten by children.

Senator ADAMS. Now, let me hear that again for certain. Because of the composition of the panel, you submitted the questions to EPA, brought them back, analyzed them, and then made your finding based upon those; is that correct?

Dr. JACKSON. The members of the committee looked at these flawed studies, and we all agreed that the studies on UDMH and daminozide were flawed. But as physicians, we felt that the onus was to be protective, the need was to be protective, and to opt for not using this product until it could be shown to be safe, rather than to take a narrow technical view, which we felt the science panel had done—which is to say the door is not toxicologically closed; it is not proven that this is a carcinogen.

We felt that the level of evidence was such that we wanted to see this product eliminated from child food products, and that was the gist of the letter that we sent to EPA in 1986.

Senator ADAMS. I see. Thank you, Doctor. Please proceed.

Dr. JACKSON. The academy reaffirms its position that we put forward in that letter, that this product presents potential long-term hazards, and no benefit, to children.

The lifetime risks to children of experiencing major chronic diseases associated with the typical American diet far exceed the risks associated with pesticide residues. For cancer alone, 30 percent of all deaths are associated with the use of tobacco, while another 35 percent are suggested to be related to a diet which contains too much fat, not enough fiber, and too few fruits and vegetables.

A diet rich in fruits and vegetables is the most healthful that children can consume. Based on the currently available data, parents should be reassured that on a case-by-case basis, the risks of pesticide residues in children's food are remote. However, if nothing is done when a risk of 1 in 1,000 or 1 in 10,000 or even 1 in 100,000 is applied across-the-board to a population of 64 million children, which is who the academy needs to worry about at-large, these low risks could theoretically result in thousands of cases of cancer spread over many years.

Therefore, the academy strongly feels that regulatory action is warranted.

Pesticides in food are only a small component of the many lifetime risks that children face. However, such exposures are preventable, and we recommend the following actions.

The academy urges the EPA to take prompt action to eliminate daminozide from use.

The Academy of Pediatrics recommends that EPA use its existing legislative authority to fill the data gaps on the effects of pesticides on human health as rapidly as possible—basically, the testimony that has been given earlier.

The academy recommends that the EPA rapidly institute regulatory action on the strength of evidence of these data.

I think when the risks and benefits are weighed under FIFRA, there needs to be a very effective weighing of the child health risks

at least equal to that weighing of the benefits of the use of these chemicals.

The academy hopes and recommends that the Congress use its legislative authority, if necessary, to assist EPA in dealing rapidly with the issues that provoke public health concerns. I think Dr. Moore alluded to that in some depth in his testimony about the obstacles he was anticipating three, 4 years down the line.

In summary, the NRDC report indicates ways in which foods that children eat could be made even more safe. The Academy of Pediatrics supports these efforts to help our children thrive on a healthy diet.

At that point, I am available for questions and comments.

Senator ADAMS. Thank you very much, Dr. Jackson.

[The prepared statement of Dr. Jackson follows:]

PREPARED STATEMENT OF DR. JACKSON

Good morning. I am Richard Jackson, M.D., chairman of the Committee on Environmental Hazards, American Academy of Pediatrics. I am a pediatrician, an epidemiologist, and have had extensive experience in occupational health, environmental health and pesticide issues. I am here today to discuss the effects of pesticide residue in the diet of children. The focus of my remarks is on daminozide, which is used mainly as a growth regulator for apples, since this is the chemical that has generated the most questions and concern 'among parents, my fellow pediatricians, and the media.

A report released last week by the National Resources Defense Council, "Intolerable Risk: Pesticides in Our Children's Foods," has raised concerns about possible hazards related to pesticide residue in the diet of children. The risks of pesticide residue in the food of children is now the subject of an intensive review by the National Academy of Sciences, as mandated by Congress and funded by the EPA, and the Canadian Ministry of Health. The results of this study will be released in 1990. It is clear that additional scientific evaluation of the actual health risks of pesticide residue will be needed to deal with this issue.

The American Academy of Pediatrics has supported the need to identify the data gaps on pesticide toxicity, particularly in terms of reproductive effects and possible long-term cancer hazards. As hazards to fetuses and children are identified in new studies intended to fill important data gaps, the EPA should take prompt and appropriate action to eliminate such hazards. To date, the EPA has been slow in taking this action. Legislation which requires cost benefit analyses of pesticides and requirements that in some circumstances the EPA buy back banned pesticides, contribute to these delays.

The NRDC report has completed an important step in a complicated risk assessment process, which is to estimate possible risks when one assumes high exposure to our most vulnerable population. This report describes the worst-case scenario. The academy concurs that the technical aspects of the worst-case scenario for those pesticides cited in the NRDC report, particularly damino4ide, indicate the need for further study, along with thoughtful and careful public policy decisions that are protective four children's health.

In 1985, the EPA briefed public health agencies on the concern their staff scientists had about the potential cancer-causing hazards of daminozide and its major breakdown product, unsymmetrical dimethyl hydrazine (UDMH). Daminozide is a growth regulator, not a pesticide, and is used primarily to prolong apple harvest time and to provide cosmetically appealing produce. Although daminozide had been in use for 25 years, the manufacturer had never completed adequate testing in animals for its cancer-causing potential. EPA staff concerns were significant because of the magnitude of the exposure: approximately 38 percent of fresh apples eaten in the United States at that time were being treated with daminozide.

Experimental animal studies done by the National Cancer Institute. the Air Force, and the University of Nebraska identified the major degradation product of daminozide, UDMH, to be a carcinogen. The International Agency for Research on Cancer lists this substance as an animal carcinogen. EPA's FIFRA Science Advisory Panel, a committee of non-EPA scientists, determined however, that none of these studies met laboratory standards for invoking regulator action on daminozide. They

recommended that no action be taken, pending completion of a definitive cancer bioassay. Although the bioassay is not completed, preliminary results support the findings of earlier studies. EPA did lower the tolerance for daminozide in food from 30 ppm to 20 ppm, but has not yet banned the product.

The American Academy Pediatrics Committee on Environmental Hazards agreed with the EPA's scientists that animal studies were convincing enough to indicate a need to eliminate exposure of UDMH to children as soon as possible. In 1986, the AAP submitted written comments to EPA regarding hazards of daminozide to children, and recommended that the product not be used on foods eaten by children. The academy reaffirms its position that this product presents potential long-term hazards, and no benefit, to children.

The marketplace responded to these concerns. It is now estimated that less than 10 percent of apples are being treated with daminozide, food processors are refusing to buy treated apples, and consumer information regarding the use of daminozide is available at some supermarkets. It is also our understanding that baby food producers have made extensive efforts to exclude daminozide-treated fruit from their products.

The lifetime risks to children of experiencing major chronic diseases associated with the typical American diet far exceed the risks associated with pesticide residues. For cancer alone, 30 percent of all deaths are associated with the use of tobacco, while another 35 percent are suggested to be related to a diet which contains too much fat, not enough fiber and too few fruits and vegetables. At present rates, one out of four persons will develop cancer in their lifetimes.

A diet rich in fruits and vegetables is the most healthful that children can consume. To the best of our knowledge based on currently available data, parents should be reassured that on a case-by-case basis, the risks of pesticide residues in children's food are remote. However, if nothing is done, when a risk of 1/1000 is applied across the board to a population of 64 million children, these low risks could theoretically result in hundreds to thousands of cases of cancer spread over many years. Therefore, the academy strongly feels that regulatory action is warranted.

The American Academy of Pediatrics is concerned about the health of children and seeks to protect them from preventable causes of illness and premature death. Pesticides in foods are only a small component of the many lifetime risks that children face. Such exposure, however, are preventable and we recommend the following actions:

The academy urges the EPA to take prompt action to eliminate daminozide from the food supply.

The academy recommends that the EPA use its existing legislative authority to fill the data gaps on the effects of pesticides on human health as rapidly as possible.

The academy recommends that EPA institute regulatory action on the strength of the evidence these data produce.

The academy recommends that Congress use legislative means, if necessary, to assist EPA in dealing rapidly with issues that provoke public health concerns.

The NRDC report indicates ways in which the foods children eat could be made safer. The academy supports these efforts to help our children thrive on a healthy diet.

Senator ADAMS. Mr. Wylie.

Mr. WYLIE. Good morning, Senator.

I would like to thank you and your colleagues for giving us an opportunity to appear before you today. As Chairman Dodd indicated, we are a good corporate citizen, and that is why we volunteered to sit here and to help the committee in this very difficult and tenuous situation.

Senator ADAMS. We appreciate your presence here, Mr. Wylie.

Mr. WYLIE. As you know, I am vice president and general manager of the Crop Protection Division of Uniroyal Chemical Company, and we are based in Oxford, CT.

Importantly, I am also a father of three sons and an uncle of 16 nieces and nephews. This is why I am as deeply concerned, as every person in this country is today, about the quality of our Nation's food supply and particularly the apples we eat.

I wanted to address some comments directly to Meryl Streep. She has left—I understand why—but I will make those comments anyway, because I think they are very important.

We applaud, the company applauds, the efforts of Mothers and Others to ensure the safety of the food supply that all our children eat. They deserve a great deal of credit, and her cause should be the cause of every citizen of the United States.

If zero residue is achievable by scientific means, there is not an agricultural chemical company in this country who would not dedicate themselves to that goal. Without the achievement through science, we are doing everything we possibly can to minimize residues in the food supply.

Senator, I consider the production of healthful and abundant food to be my line of work. My industry produces products that enable U.S. farmers to bring in the most abundant, freshest, and most wholesome food supply in the world.

The next time you are in the produce section of your food store, take a look at the variety and quality of the fruits and vegetables. American farmers simply could not put those groceries in your store without the crop protection products that our industry provides.

As is now well-known, our company manufactures a product called Alar. This is a truly remarkable product, and it is a safe product. It is a growth regulant that reduces the overall need for pesticide use. It allows growers to supply high-quality, nutritious products year-around. Without Alar, many apple growers would produce fewer and lower-quality apples.

Importantly, Alar represents less than one percent of our company's gross sales. That is a very important statistic. Our business stake here is not in this product, but in the continued success of our Nation to produce and to deliver wholesome food to American families.

But we are not the real victims of the current campaign that is frightening American consumers about eating apples and apple products. The real victims are the children of this country and those that you saw in this hearing room earlier today—children who will be denied nutritious food and farmers whose livelihoods are seriously threatened.

It is the farmers and their families who are losing thousands of dollars because their customers have been needlessly frightened into thinking that fresh fruits and vegetables are harmful to their health.

The hysteria that has surrounded Alar and apples is totally unnecessary and unjustified. Our food supply and our children are not threatened by Alar. Apples are still safe to eat.

I agree with Meryl Streep in her belief that food should be safe, and I applaud and appreciate her efforts to bring attention to this very important subject. All of us—consumers, Government, and industry—must continue to work together to improve diet and health.

But a fear campaign—that scares parents and children and that victimizes farmers and farm workers—is not in the public interest and is not justified by the facts.

This is a central question here, and the question is this: Should parents and families be afraid to buy apples?

The EPA says no. The EPA says there is no reason for people to stop eating fresh fruits and vegetables.

The American Council on Science and Health, a nonpartisan, nonprofit public education group of over 200 scientists, physicians and policy experts, says no. They say the NRDC report has absolutely no basis in scientific fact.

The California Department of Health says no. They say the NRDC report is reactionary and has created a toxic bogeyman.

The National Research Council says no. They say residues do not pose a health problem, and eating more fruits and vegetables will actually reduce the risk of cancer.

In fact, no leading cancer epidemiologist even remotely believes that apples, tomatoes, potatoes, or carrots contribute to this Nation's cancer toll.

The apple scare, Senator, is unnecessary.

The NRDC report is based on data which EPA's Independent Scientific Advisory Panel said was seriously flawed more than 3 years ago. And you have heard a great deal of testimony about that this morning.

The NRDC report uses flawed data and therefore has false conclusions. This is not a scientific study and is not information which Congress or the American public can trust of rely upon.

It will not take much investigation, Senator, by this committee or by Government scientists to reveal the shallowness of the NRDC study, and therefore to reveal the total lack of need for the fear and falling confidence in the safety of apples and other foods in our Nation's food supply.

Senator, I urge you and your colleagues to do what you can to restore confidence in America's food supply. Look at the evidence. Question those who spread fear. Respect the good work of American agriculture. Protect the strength that an abundant and healthful food supply adds to our Nation's nutritional position in the world community.

Let us all do what we can to assure mothers and all Americans that we can keep buying fresh fruit and vegetables with full confidence. Let us tell consumers that we have the world's safest food supply and yet we are still not satisfied because we—Government and industry, together in the public interest—will continue to work together to protect crops safely, to increase the use of biorational products and to keep reducing the amount of food residues.

I pledge to you that my company will do its part in this program. My company's business is the production of wholesome food. Our products are safe, and they help to promote a more healthful food supply for the American public. We are open to inquiry. In fact, we welcome it, because that is how we succeed and operate—through scientific review as we meet the needs of our customers.

We do not welcome an inquisition which only feeds on public fear and that benefits no one. If there are doubts about our products, we would ask immediately—and I emphasize immediately—that an independent scientific review by the EPA's own scientific advisory panel immediately look at this.

Senator, we sincerely believe in the safety of Alar. We are committed to continued progress in assuring the public a food supply that remains the envy of the world. I urge you not to consider the interests of our company because our interests are very, very small. This is not a dollar and cents issue for us.

What I do ask you to consider are the interests of the farmers who are doing their best to produce this food supply and those of the children and adults who should not be deprived of fresh fruits and vegetables.

The members of this committee have the power to end the apple scare—you and the news media on which people depend for reliable information. We encourage you to consider the scientific evidence when weighing your position on this matter.

Thank you, Senator.

Senator ADAMS. Thank you, Mr. Wylie.

Ms. HATHAWAY. Thank you, Senator Adams.

The Natural Resources Defense Council is very appreciative of the opportunity to be before you today to answer the various questions that have been raised and to assure you that we stand firmly behind the numbers in our study, which we believe to be a great under-estimate of the risks posed by all pesticides in foods.

Accompanying me today is Al Meyerhoff, who is our senior attorney in the San Francisco office, who has brought litigation concerning daminozide in 1986 to require that the Environmental Protection Agency eliminate the use of this pesticide in food.

Senator ADAMS. I am sorry. Would you repeat that date, please?

Ms. HATHAWAY. That was in 1986. We are waiting for the Supreme Court to decide whether it is going to review that case.

I am working on this issue as a lobbyist, because I do believe that something must be done here in the Congress to address a problem that has been well-known for many years and has not been addressed adequately by the Environmental Protection Agency.

Let me explain to you why I think it is that, though people will point to disagreements with us, our study is fundamentally sound; that people's concern about the product daminozide and the breakdown product from that chemical, UDMH, is not hysterical, it is not an overreaction; it is a prudent reaction to learning some facts about this chemical that in fact the agency that is charged with regulating this chemical does know and that the public deserves to know.

First of all, there have been charges that in order to receive a damaging level of UDMH, the breakdown product from this chemical, Alar, made by Uniroyal, one would have to eat 28,000 pounds of apples a day. That claim has actually been printed in full-page advertisements in a number of the major newspapers in the country. It is just blatantly false.

Anyone who does risk assessment, whether Dr. Moore or Dr. Frank Young, agrees with me—I have asked them on this point—that a charge of that kind is simply false, has no bearing in fact.

It is not the case, of course, that in animal studies you give the animals the exact same dosage that humans are likely to receive, because for one thing, humans receive a variety of different doses.

What you do in animal studies is test at high levels, and then there are extrapolations made from the animal tests to the actual dosage levels that occur in human beings.

Let me tell you what our study did. It looked at the actual amount of the pesticide UDMH, the breakdown product from Alar, in our food supply. That data was supplied by Uniroyal to the Environmental Protection Agency. It was based on a market basket survey that occurred in 1986.

Then we looked at children—children under the age of 6—consumption. That data came from the United States Department of Agriculture, a survey they performed in 1985–86.

Then we looked at the risk numbers that had been performed on laboratory studies of UDMH that the Environmental Protection Agency derived from pre-1985 studies.

The amounts that children ate in our study averaged 1 ounce of apple and around 2 ounces of apple juice. That is how much we were assuming, based on the Government data, was in fact being consumed. How much residue of this UDMH breakdown product was there? Only in the parts per billion range—let me emphasize, parts per billion—ranging from one up to 100 parts per billion, depending on the different product.

Even so, our conclusions were that one child out of approximately 4,200 would be likely to develop cancer just from ingestion of products with the UDMH breakdown product in them during their preschool years.

We are not assuming massive consumption of apple products. We are not assuming vast amounts of this residue. What we are assuming is in fact what the Government's own data does reflect, and that is very reasonable, moderate levels of consumption, very low residue levels, and still a considerable and really intolerable cancer risk.

Now let me also address the question that has been raised on how much of this chemical is still in our food supply. I think it is an important question, and it is a hard one to answer immediately.

We did hear from the commissioner of the Food and Drug Administration that in his testing he has found that half of the apples tested did contain daminozide. EPA, based on an informal grower survey, said maybe 5 percent of the apples contained daminozide. If you go into any grocery store, every sign says no apples contain daminozide. So you really wonder what is the truth of the matter.

I do not know that we are ever going to get to the truth of this matter. Today, I think that what we are going to have to say to each other is it is a legal chemical, it is used by some growers, and there is no way for the consumer to tell which growers used it and which ones did not. That is why there is consumer concern about this chemical. It is not because we assume that every apple we pick up was indeed treated, and it is not because we assume that people used massive levels of treatment on these apples that they did treat. It is because even very low levels of this chemical can be very dangerous that we are concerned.

Now, until it is not legal to use this chemical, there are going to be growers who are going to continue to use it, and growers who choose not to are at a competitive disadvantage if they choose not to use it for the sake of protecting public health.

So, if for no other reason, if not out of concern about prudent public policy, which ought to be to eliminate exposures to carcinogens where one can, the EPA ought to act quickly to regulate the use of daminozide and eliminate UDMH from our food supply in order to ensure that growers are really not put in a bind where, if they have concern about public health, they are at a competitive disadvantage with their colleagues. I think that is an intolerable situation for growers, who in fact are trying to perform a service and supply food that is safe.

Now, there also has been some discussion of the fact that EPA has a different basis for calculating consumption, and that is an earlier United States Department of Agriculture survey.

We used better data. Now, I agree with people that our data cannot be said to be definitive; it is always going to be evolving as to what in fact people are consuming and how much the Government knows about that. But we used the best available data, 1985–86 data, and that data was in fact designed to be representative of our entire population's food consumption patterns.

Now, on the point as to these flawed studies being the basis of a risk assessment that were in fact the way we calculated the UDMH risk, the risk from the breakdown product, let me say these studies were not so flawed as to not lead the Environmental Protection Agency to say that both daminozide and UDMH were probable human carcinogens.

EPA, based on these exact same studies, in 1985 came to that conclusion, that both daminozide and its breakdown product were probable human carcinogens. They knew that these studies were not performed with the science that we now have at hand. They knew that these studies were performed in the Seventies, and clearly, better studies could be performed.

But I ask you what is it that the Government is asked to do here in a regulatory agency. Are they supposed to wait for perfect knowledge, or are they supposed to use the best available data they have before them, calculate the risks based on that data, and protect our food supply from those risks that they estimate? If we turn out to be wrong when further studies are performed, then why don't we allow that chemical to come back into the food supply—but during the pendency, why are we experimenting on our children? That is my view as to why we should use the old studies, which are indeed the only completed cancer studies on UDMH, this breakdown product, to perform this risk assessment.

Now, the Environmental Protection Agency and we have different ways of quantifying the risk from UDMH, the breakdown product, but I want to point out to you, Senator Adams, that the one thing that we are in agreement on is that UDMH poses a risk far in excess of what EPA itself has said is an acceptable risk level.

The Environmental Protection Agency says that the risk level from UDMH in our food supply probably is about 45 times the acceptable level, the one in one million level that EPA says is acceptable for cancer in our food supply.

Now, we say that that risk is not that low: that because of children's increased consumption and because of the pre-1985 studies that have been performed on UDMH, that the actual cancer risk

from UDMH is 240 times what the Government says is an acceptable level of cancer-causing chemicals in our food supply.

Well, in a sense, does it really matter who is right? In either case, it is an unacceptably high level even given the Government's own standards of how much cancer-causing chemicals should be in our food.

So I ask you why do we quibble over the numbers here? There is not a campaign going on to create fear. What we would like is to present facts to the American public, to the Congress, to the regulators, and say let's do something about these facts. There is no way we are going to overcome a major hazard in the fact that we have not regulated pesticides adequately to date unless we acknowledge that fact honestly.

That is what we are here to present to you, and we hope that with your help, we are going to be able to regulate these pesticides in our food supply and ensure that growers, who are doing their utmost to reduce pesticide levels, are supported in that effort and in fact are praised for that effort and become the models for how we produce food in the next century.

Thank you very much.

Senator ADAMS. Thank you, Ms. Hathaway.

[The prepared statement of Ms. Hathaway and Mr. Meyerhoff follows:]

PREPARED STATEMENT OF JANET S. HATHAWAY AND AL MEYERHOFF

Thank you for the opportunity to testify before this committee about NRDC's recent report, "Intolerable Risks: Pesticides in Our Children's Food." I am Janet Hathaway, NRDC senior project attorney. I joined NRDC's pesticide project 2 years ago in order to work with Congress to strengthen the laws which govern how pesticides are used in America. I am accompanied today by Al Meyerhoff, NRDC senior attorney, who has been our principal litigator on pesticide issues.

The Natural Resources Defense Council (NRDC) is a nonprofit organization of attorneys and scientists dedicated to protecting public health and the environment. NRDC has worked to reform the laws and policies governing pesticide use for more than a decade.

I. NRDC'S METHODOLOGY

Two years ago we embarked on this study to ascertain whether actual levels of pesticide residue in our preschoolers' diet pose a significant risk to our children's health. We collected Government data on the diets of preschool children, pesticide residue levels, and risks posed by some 23 of the approximately 300 pesticides legal for use on food in the United States. Of these 23 pesticides, the Environmental Protection Agency (EPA) identified 8 as potential cancer-causing chemicals and 15 as capable of causing neurotoxic effects, or damage to the nervous system.

NRDC estimated the health risk to preschoolers during their first 6 years of life (0–5 years) by determining consumption rates for 27 fruits and vegetables most frequently eaten by children. Preschoolers' exposure to these 23 pesticides was determined by combining children's consumption rates for the 27 food types with actual pesticide residue levels found in these foods. Pesticide exposure estimates were then assessed to determine the preschoolers' risk of developing cancer or experiencing a disruption in central nervous system function.

To develop an adequate database of preschooler exposure to pesticides, NRDC used consumption data from a nationwide food consumption survey of children and adult women conducted in 1985 by the U.S. Department of Agriculture (USDA), and data on residue levels of 23 pesticides (and important metabolites) actually measured in 27 types of fruits and vegetables. The data on pesticide residues in produce were derived from analyses of over 12,000 food samples conducted under regulatory programs of the Food and Drug Administration (FDA) and the EPA.

II. Principal Findings of "Intolerable Risk."

Preschoolers are being exposed to hazardous levels of pesticides in fruits and vegetables. Between 5,500 and 6,200 (a risk range of 2.5×10^{-4} to 2.8×10^{-4}) of the current population of American preschoolers may eventually get cancer solely as a result of their preschool exposure to eight pesticides or metabolites through eating fruits and vegetables during their preschool years.[1] These estimates are based on scientifically conservative risk assessment procedures. They indicate that more than 50 percent of a person's lifetime cancer risk from exposure to carcinogenic pesticides used on fruit is typically incurred in the first 6 years of life.

The potent carcinogen, unsymmetrical dimethylhydrazine (UDMH), a breakdown product of the pesticide daminozide, is the greatest source of the cancer risk identified by NRDC. The average preschooler's UDMH exposure during the first 6 years of life alone is estimated to result in a cancer risk of approximately one case for every 4,200 preschoolers exposed. This is 240 times greater than the cancer risk considered acceptable by EPA following a full lifetime of exposure.[2] For children who are heavy consumers of the foods that may contain UDMH residues, NRDC predicts one additional case of cancer for approximately every 1,100 children, 910 times EPA's acceptable risk level.

The carcinogenic risk estimates for daminozide are based on results of a 1986 market basket survey that EPA required the manufacturers of daminozide to conduct. Although daminozide use may have decreased since 1986, there is no reliable information on whether—or to what degree—use has decreased. EPA has recently stated that approximately 5 percent of apples are treated with daminozide. However, this figure was based on informal conversations with growers, who may have a strong self-interest in portraying their products as daminozide-free. In contrast to EPA's figure, one Uniroyal manager privately stated that 10–11 percent of the Nation's apple acreage was treated with daminozide in 1988.

Further, an independent laboratory found in 1988 that 30 of apples tested from one large supermarket chain—which claimed to be selling only daminozide-free apples—in fact contained detectable daminozide. More recently, a survey indicated that 23 of Vermont's apple acreage was treated with daminozide. These data were not considered when EPA developed its use estimate and raise serious questions about the accuracy of the agency's figure. In the absence of Government testing to verify grower claims about daminozide use, the manufacturer's 1986 market basket survey remains the only accurate indicator of actual residues in food.

Preschoolers also receive unacceptable exposure to the carcinogenic fungicides captan, chlorothalonil, folpet, and ethylene thiourea (ETU), the metabolite of the fungicide mancozeb. NRDC estimates that average exposure to these pesticides from consumption of 27 fruits and vegetables from birth through age 5 may present a lifetime risk of one cancer case for every 33,000 to 160,000 children exposed. That means that out of the current preschool population, between 140 to 670 children may develop cancer sometime during their lifetime as a result of exposure to these fungicides. These risk estimates are approximately two to seven times what EPA considers acceptable following a full lifetime of exposure. These estimates are unchanged by EPA's recent decision to cancel certain minor food uses of captan since none of the food uses contributing to preschoolers' risk in our calculation were canceled by EPA.

NRDC also found that at least 17 percent of the preschool population, or 3 million children, receive exposure above levels the Federal Government considers safe to neurotoxic organophosphate insecticides just from raw fruits and vegetables. High level exposures to these insecticides can cause nausea, convulsions, coma, and even death. Dietary exposures received by preschoolers may induce behavioral impairments and alter neurological function.

III. Explanation of Children's Enhanced Risk

NRDC's analysis of exposure, based on studies of food consumption by children and women, determined that relative to their weight preschoolers receive much

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[1] These estimates are based on consumption statistics of preschoolers in the 1985 USDA survey who completed 3 three or more days over the course of a year. These data were used to approximate average daily exposure over the year. However, cancer risk estimates were also made based on daily intake for all preschoolers in the survey and result in an estimated 5,700 to 6,400 additional cancer cases (2.6×10^{-4} to 2.9×10^{-4}) in the preschool population.

[2] Using daily intake for all preschoolers in the survey (see footnote 1), UDMH still accounts for the majority of the cancer risk which is 250 times the level EPA considers acceptable following a full lifetime of exposure.

greater exposure than adults to the majority of the pesticides analyzed in this report. The average preschooler receives more than five times greater exposure to the fungicide mancozeb, nine times greater exposure to the neurotoxic organophosphate azinphos-methyl and 12 times greater exposure to UDMH, the carcinogenic metabolite of daminozide, than adults. The typical preschooler receives four times greater exposure, on average, than adults to the eight carcinogenic pesticides evaluated. The youngest children receive the greatest pesticide exposure. Relative to adult women, toddlers receive more than eight times the exposure to mancozeb, 15 times greater exposure to azinphos-methyl and 18 times greater exposure to UDMH, than women.

Preschoolers have greater exposure to pesticide residues than adults because they eat more food, relative to their weight, and consume much larger quantities of fruit, which has a high likelihood of being contaminated with pesticides. Fruit comprises 20 of the adult diet and 34 percent of the preschoolers diet. Preschoolers eat six times as much total fruit, seven times more grape products and seven times more apples and applesauce, relative to their weight, than adults. Apple juice is a particular favorite of children. The typical preschool child consumes almost 18 times as much apple juice and the typical toddler more than 31 times as much apple juice, relative to their weight, as the average adult woman.

Fruit is highly likely to contain pesticide residues. The 1987 FDA's food monitoring program found that 50 percent of all fruit samples had detectable levels of pesticides. This contamination rate is higher than that of any other commodity and may significantly underestimate the full extent of contamination. Routine FDA monitoring methods cannot detect approximately 60 of the pesticides likely to leave residues on food, including many carcinogenic fungicides used widely on fruit.

IV. Report Findings May Underestimate Preschooler Risk.

The NRDC study may significantly underestimate the full extent of preschooler exposure and the subsequent health risk from pesticides in food for several reasons. First, this study assesses cancer risk that results from exposure only from birth through age 5 to pesticides in food. The total lifetime cancer risk will be greater since estimates do not include risk incurred from age 6 to 70+ years. Further, this study assesses the health risk from only 23 pesticides out of the 300 that can be legally used on food. Of the 66 pesticides EPA believes to be potentially carcinogenic and allows to be used on food, only eight were evaluated by NRDC. Routinely used FDA monitoring methods—from which much of the residue data used in the NRDC analysis were obtained—can detect only approximately 40 percent of the pesticides likely to leave residues on foods. Of all food use pesticides classified by the Federal Government as posing a moderate to high health hazard, approximately 40 percent cannot be detected by FDA monitoring techniques.

NRDC has only assessed exposure from 27 fruits and vegetables out of the many commodities that are consumed daily by preschoolers and that may contain pesticide residues. Milk products are perhaps the most conspicuous of the foods absent from the exposure estimates. The average preschooler has a milk intake that is almost five times higher than that of the typical woman. EPA estimates that 60 percent or more of the preschooler's exposure to the carcinogenic fungicide captan, for example, may come from residues in milk. EPA's recent cancellation of the minor food uses of captan does not appear to reduce this estimated exposure from milk. Pesticides get into animal products, including meat and eggs, as well as milk, via pesticide-contaminated feed. Drinking water may also be a significant source of pesticide exposure, especially in rural areas. EPA has reported that the normal agricultural use of pesticides has resulted in detectable pesticide concentrations in the groundwater of 26 States.

This report focuses primarily on the risk of developing cancer or the probability of disruption of normal nervous system function from dietary exposure to pesticides. However, many of the pesticides in the study cause additional adverse health effects, such as damage to the kidney or liver, effects on the immune system, or changes in reproductive capacity. Further, the full impact on preschooler health from exposure to pesticides in food is unknown since the majority of the 600 active pesticide ingredients (representing 50,000 pesticide products actually in use) have not been tested according to modern testing requirements, or the test data are unacceptable by today's standards. The National Academy of Sciences (NAS) concluded in 1984, based on an analysis of a representative sample of pesticides, that data needed to conduct a complete health hazard assessment were available for only 10 percent of the pesticide products on the market. Of the 23 pesticides evaluated for NRDC's study, 19 (83 percent) were registered by USDA in the 1950's and 1960's

before any comprehensive testing requirements were in place. EPA simply adopted their registrations later.

This study underestimates the risks to children for a number of other important reasons. Children are likely to be more susceptible to the effects of nervous-system toxins and cancer-causing chemicals than we have assumed in making our estimates. However, data regarding the degree of enhanced sensitivity in preschoolers were not available for the specific pesticides evaluated in this report; therefore, susceptibility could not be factored into our health risk assessment.

The Government does not require adequate testing for neurotoxic effects of pesticides. Long-term neurological testing for chronic effects of organophosphates and other neurotoxic pesticides is not required; the current tests assess only if the pesticide is capable of causing a specific delayed paralytic reaction following acute and subacute exposure.

Finally, "inert" ingredients, which are used to dilute, propel or Stabilize the active ingredients, are not requlated, even though many are known to cause cancer or other health hazards. Moreover, EPA has historically not required submission of health or safety information on "inerts". These compounds, labeled "inert" because they are not effective against the pest for which the product was designed, have been exempted from Federal requirements for setting permissible residue levels for pesticides in food. Among the inert ingredients known to be hazardous are benzene, carbon tetrachloride, chloroform, formaldehyde, lead and methylene chloride. The exposure to such dangerous "inert" ingredients was not quantified in calculating risk from consumption of pesticides in food.

V. Responses to NRDC's Critics.

Criticisms of the report have been leveled by agency officials and representatives for organizations such as Uniroyal, the manufacturer of the pesticide daminozide, and the International Apple Institute. NRDC continues to stand behind our methodology and our conclusions. We wish to reply to some of the charges which have been made about our report.

A. The International Apple Institute's Claims that it would Take 28,000 Pounds of Apples per Day for a Person to Approximate the UDMH Exposure Levels Received by Laboratory Animals.

All of the Government's risk assessments are performed by extrapolating from high dose animal experiments to the lower doses expected in the human population. NRDC's risk assessment is no different. We know that children are exposed to UDMH in apples, peanuts and other commodities, and we know that their exposure levels are low. The pertinent question is whether the levels of exposure are likely to result in a real health hazard. We determined that even at actual exposure levels, the hazard is significant.

NRDC studied the actual pesticide residue levels and children's actual consumption levels. We did not assume that children eat the same amount of UDMH as was ingested by laboratory animals. To the contrary, from 1985-86 USDA data we determined that the average preschool child consumes approximately one ounce of apple and two ounces of apple juice per day.

We also knew that UDMH levels were relatively small even in foods which had been treated with daminozide. Daminozide's manufacturer, Uniroyal, submitted to EPA data on the residue levels found in 1986 in a variety of commodities such as apples, cherries, peanuts and grapes on which daminozide is used. According to Uniroyal, these commodities contained average UDMH levels ranging from approximately 1 to 100 parts per billion. Even at the parts per billion level in foods which are heavily consumed by preschool children, UDMH poses a significant carcinogenic risk. We estimate a risk of one cancer for every 4,200 preschool children based on children's average consumption of foods containing UDMH residues. Children's consumption of apple products contributed 74 percent of the total risk from UDMH exposure in preschooler's diets.

Therefore, the International Apple Institute is greatly mistaken in stating that consumption of 28,000 pounds per day over a 70-year lifetime is needed to create a hazard for the human population. As our data demonstrate, consumption of only a few ounces per day of commodities containing very low levels of UDMH, daminozide's breakdown product, poses a significant health hazard.

B. Environmental Protection Agency Disputes NRDC's Use of USDA 1985-86 Consumption Data.

EPA has questioned NRDC's risk estimates in part because NRDC derived them from a United States Department of Agriculture 1985-86 dietary study which surveyed the eating habits of nearly 500 children. EPA's Tolerance Assessment System,

the data base which EPA plans to use to set future legal limits for pesticide residues in food, is based on a larger 1977 USDA survey. NRDC believes that our use of the 1985–86 diet survey was appropriate and provides the best estimate of current food consumption patterns.

Despite the relatively small sample size, USDA designed the 1985–86 survey to reflect regional and cultural diversity in food consumption. Participants were selected to represent a variety of demographic factors believed to influence dietary habits.

The 1985–86 USDA diet survey was superior to the 1977 survey because it evaluated respondants' diets over a period of at least several months. This resulted in a dietary survey which followed an individual's food consumption through different seasons and idiosyncratic variations. Because what we eat on any 1 day is unlikely to serve as an accurate predictor of what we eat year-round, NRDC considers the 1985–86 diet survey a more useful indicator of dietary habits.

The 1985 USDA data is also particularly useful because it enables one to contrast children's consumption (and hence their pesticide exposure) with that of adult women. The fact that children consume more fruit per body weight than their parents is significant, and should be quantified by those seeking to regulate pesticide exposure.

Finally, NRDC feels that the more recent USDA survey is probably more representative of food consumption patterns today. For decades, Americans have been told to increase their intake of fresh fruits and vegetables. The 1985–86 USDA survey indicates substantially greater consumption of fresh fruits and vegetables than did the 1977 survey relied on by EPA, probably reflecting the fact that many Americans have taken doctors' advice. The trend toward higher fruit and vegetable consumption is important in evaluating dietary pesticide exposure, because many pesticide residues occur at greater frequency and in higher concentrations in these commodities. NRDC's use of the 1985–86 USDA food survey is more likely to accurately assess present dietary pesticide exposures than would be possible through use of the earlier USDA study.

C. EPA Challenges NRDC's Use of the UDMH Cancer Potency Factor Derived from Pre-1985 UDMH Cancer Studies.

EPA has stated that a discrepancy in the dietary UDMH cancer risks calculated by NRDC and EPA results from the fact that NRDC and EPA used different cancer potency factors, or measures of the carcinogenic potential, in calculating the risk from UDMH, the breakdown product of daminozide. While this is true, NRDC believes that it used the correct cancer potency factor to estimate the risk posed by UDMH.

NRDC used the UDMH potency factor which EPA calculated in 1985 from the results of long-term animal tests performed to evaluate the cancer risk from UDMH by the U.S. Air Force and researchers at the Eppley Institute for Research in Cancer and Allied Diseases, University of Nebraska Medical Center. EPA used these studies to conclude in 1985 that UDMH was a "probable human carcinogen" and to recommend that daminozide's uses be canceled.[3] However, in 1986, following a one-day hearing before EPA's Scientific Advisory Panel at which the chemical's manufacturer, Uniroyal, objected to the studies, EPA reversed its recommendation. EPA decided that the pre-1985 studies were insufficient to quantify the cancer risk and granted Uniroyal the right to continue to sell daminozide for use on food for the years it would take for Uniroyal to perform its own cancer studies on daminozide and UDMH.

NRDC used EPA's 1985 cancer potency factors because we believe they constitute the best available data on the cancer risk posed by UDMH. To date, no other cancer studies on UDMH have been completed. Although the pre-1985 cancer studies may be imperfect guides to the cancer risk posed by UDMH, we believe that it is imperative for regulatory agencies to regulate based on the best available data instead of futilely waiting for perfect knowledge.

On February 1, 1989, EPA announced concerns about the occurrence of statistically significant increases in blood vascular tumors in animals exposed to UDMH, based on data from the halfway point of Uniroyal's UDMH study. From this still incomplete study, EPA estimated an alternative cancer potency factor which is lower than that derived from the pre-1985 studies. NRDC requested but was not given EPA's revised UDMH cancer potency factor months before NRDC released its report. We believe that the pre-1985 laboratory tests form a reasonable basis for

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[3] Environmental Protection Agency, "Daminozide Special Review Position Document 2/3/4," Draft, September 12, 1985, pp. 11-30.

estimating the cancer risk from UDMH in the absence of completed, more reliable long-term animal studies.

It is important for the committee to note that even EPA's February 1, 1989 estimation of the dietary cancer risk from UDMH, while lower than the NRDC estimate, is 45 times EPA's self-proclaimed standard for "negligible" cancer risk, one cancer in a population of one million. Therefore, whether one uses EPA's UDMH cancer potency factor derived from Uniroyal's 1988 interim report, or whether one uses EPA's 1985 UDMH potency factor, the risk to the population—and particularly to children—from the daminozide breakdown product is high. NRDC believes that the magnitude of the risk warrants immediate and dramatic Government action to curtail the use of daminozide in food.

VI. EPA'S Program to Protect the American Food Supply from Pesticide Contamination Has Been a Failure.

The ongoing public controversy about EPA inaction in protecting the general population, and especially children, from the pesticide daminozide in the food chain is not an isolated incident. On the contrary, it is the latest in what has been a series of failures by the Federal Government to fulfill their responsibilities under the Federal Food, Drug and Cosmetic Act that have occurred for more than a decade. The agency's record in this regard has been marked by case after case of regulatory foot-dragging, inordinate influence by the chemical industry, and twisted analyses of clear mandates under the Act in order to avoid removing cancer-causing chemicals from our food.

Last year, the EPA Administrator announced that this legacy of neglect would be changed and that the health risks presented from pesticides in food were being elevated to the agency's No. 1 priority. In doing so, a high-level EPA official said, "Pesticides dwarf the other environmental risks the agency deals with. Toxic waste dumps may affect a few thousand people who live around them. But virtually everyone is exposed to pesticides." Unfortunately, as recent events involving daminozide and captan make clear, this rhetoric has not been reflected in an actual change in agency practice.

Examples of EPA failures in the past that have contributed to this "pesticide of the year" are legion. Perhaps the best example before daminozide was the lack of effective EPA regulation of the pesticide ethylene dibromide (EDB). Ten years after the National Cancer Institute first determined that "there is strong evidence that EDB is likely to cause cancer in humans," in 1974, the chemical remained on the market. It had languished for many years in the EPA "special review" (then called RPAR) program, the same cancellation process now being relied upon to regulate daminozide. In late 1983, EDB residues were found in the Nation's grain supply, in citrus crops and other foods, as well as drinking water, and several States including Florida, New York and California, took regulatory action. Following a great deal of public clamor, and Congressional hearings severely criticizing the agency, the EPA Administrator William Ruckelshaus then banned the chemical.

The risks from EDB in food are similar to those now presented by daminozide. For the population as a whole, EPA calculated the additional risk of getting cancer from eating foods contaminated with EDB to be roughly three in 10,000 with the "realistic worst case" of 1.5 in 1,000. In a population of 200 million people, these risks translate to 70,000 to 300,000 additional cancers over a lifetime exposure to EDB in food. The chemical also is a powerful reproductive toxin.

A year prior to the EDB experience, the Nation was startled to learn that much of the milk supply in the State of Hawaii had been contaminated for several months with the pesticide heptachlor, a pesticide banned in the continental United States after being linked to leukemia and neurological disorders. Heptachlor had been sprayed on pineapple leaves which were then fed to dairy cows and resulted in high residues in milk and other dairy products. After this discovery, the Government failed to act for several months until finally the Food and Drug Administration required that 90 percent of the milk on the island of Oahu be destroyed. Heptachlor continued to turn up in breast milk long afterwards. And, more recently, heptachlor again found its way into the news when its residues were found in the milk supply in several southwestern States.

Other examples of EPA inaction and inordinate delays when confronted by pesticide risks in the food supply include such chemicals as DBCP, a close relative of ethylene dibromide and a powerful carcinogen finally banned by EPA in 1979; toxaphene, finally banned by the agency in the mid-1980's; carbon tetrachloride and other grain fumigants that presented high cancer risks for many years to consumers; and the extremely toxic pesticide aldicarb (or temik) which caused numerous

miscarriages and other adverse health effects and resulted in confiscation of more than a million watermelons following its illegal use in California. Examples such as daminozide, EDB, DBCP, heptachlor and other hazardous pesticides do not present the exception to a thoughtfully considered and well executed public policy: They are instead the rule. Without fundamental legislative change making quite clear the agency's principal responsibility to protect the public health from these toxic chemicals, we expect to repeat the daminozide experience once again. The EPA record reflects bureaucratic intransigence even when the agency confronts a serious cancer risk, coupled with a critical misconstruction of the agency's statutory authority and responsibility under existing law. As documented in Intolerable Risk, for example, pesticide tolerances were generally set many years ago, are based almost entirely on dietary assumptions for fully grown adults (themselves generally incorrect), and ignore the special dietary patterns of children. Yet, under sections 408 and 409 of the Food, Drug and Cosmetic Act, the threshold duty of the agency is to protect the public health of all citizens, including the young. Permitting cancer risks several hundred times higher than the level of risk EPA now classifies as "negligible" does not fulfill that statutory mandate. Moreover, contrary to views expressed in the past by various EPA spokespersons, the burden of proof of demonstrating that the residue of a pesticide in food is fully protective of public health lies squarely on the pesticide industry and not the Government.

In addition, EPA continues to incorrectly interpret the Federal Food, Drug and Cosmetic Act's strict anti-cancer provision, the "Delaney" clause. The agency flatly refuses to apply this provision "retrospectively" to chemicals already on the market. Recently, Assistant Administrator John Moore stated publicly that while he would not register daminozide for use on food today, his hands were tied in preventing its continued use despite clear evidence of carcinogenicity.[4] This position has no basis in logic or in law. The belief that the Delaney prohibition against carcinogens in processed foods, now contained in section 409 of the Act, applies to new chemicals coming on the market but was not intended by Congress to apply to so-called "old pesticides" that have now been tested and determined to be carcinogens finds no support in the legislative history of the FFDCA or in the laws' basic intent to protect the public from cancer-causing chemicals.

EPA's position is directly contrary to the view of the Federal Food and Drug Administration, the agency principally charged with carrying out the requirements of this Act. In recently articulating this position in a *Federal Register* notice ("Regulation of Pesticides in Food: Addressing the Delaney Paradox Policy Statement," *Federal Register*, October 19, 1988) the EPA candidly acknowledged that their principal rationale for their interpretation of the Delaney clause was that otherwise section 409 would require certain old pesticides to be removed from the market. This was the result that Congress intended and that the public health requires. In that same *Federal Register* notice, EPA contended that even for new pesticides, section 409 permitted a "de minimus" one in a million risk level. This position has been decisively rejected by the courts most recently in *Public Citizen* v *Young*, a 1988 decision by the United States Court of Appeals for the DC Circuit

Finally, as we have noted in our study on pesticides and children, EPA continues to fail to meet its existing legal obligations to act to remedy the serious health risks presented by so-called "inert" ingredients in the food chain. Food use pesticides contain both an active ingredient and an inert ingredient, the latter usually used as a stabilizer or carrier for the active. While many of these inert ingredients are not acutely toxic to the target organism, they are far from benign. (For example, for many years after DDT was banned as an active ingredient, unbeknownst to EPA, it still was used as an inert ingredient in the pesticide kelthane.) EPA has now classified some 50 inert ingredients as toxic, including such substances as benzene, vinyl chloride, zylene and asbestos, yet all inert ingredients have been granted blanket exemption from the tolerance-setting requirements of the Food, Drug and Cosmetic Act. These substances are simply allowed to exist in the food supply without any regulation despite undisputed evidence of toxicity, including in many cases, carcinogenicity. The agency is now empowered to revoke exemptions from the tolerance requirements of the Food, Drug and Cosmetic Act which are permissible under agency regulations only where the chemicals present "no hazard to human health." Yet EPA, following its now well-established tradition for active ingredients, simply failed to take any action whatsoever.

In short, for more than a decade, EPA's record of protecting the food chain from hazardous pesticides has been characterized by a consistent failure to carry out its

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[4] "A is for Apple," CBS's "60 Minutes," February 26, 1989.

principal mandate: Protecting the American consumer from the health risks presented by these most toxic of chemicals. The failure of the Government to act forcefully and without inordinate delay contributes to a general distrust of agency regulation despite repeated rhetorical assurances from Government officials to the contrary.

VII. Recommendations for Reform of Laws Governing Pesticides in Food.

Residues of pesticides with known toxic effects are widely present in the food supply. In particular, these residues pose a serious health threat to preschoolers. This public health problem is largely the result of inadequate regulation on the part of the Federal Government. Immediate action is necessary to close the loopholes in EPA's and FDA's regulation of pesticide residues in food. Further, Congress must act to assist growers in reducing their use of pesticides. This chapter provides specific recommendations for congressional action in order to assure the safety of the food supply.

A. Congress Must Require EPA to Protect the Public From Pesticide Residues in Food.

The Federal Food, Drug and Cosmetic Act (FFDCA) governs the types of pesticides, and the concentrations of residues, which can legally occur in our foods. Tolerances, or legal limits on pesticide residues, are set by EPA under the FFDCA. EPA will be collecting important new data under the 1988 amendments to the FIFRA program, but it is not clear when or how EPA will use these data to reestablish tolerances at new levels which will truly protect the public health.

A minimum of 10 fundamental EPA reforms is needed to ensure the safety of our food supply from pesticide residues.

1. EPA Should Rapidly Establish New, Protective Tolerances for All 23 Pesticides Which Are the Subject of NRDC's Study.

For all of 23 chemicals which are the subject of NRDC's study, EPA should rapidly set legal limits which ensure that any residues of these chemicals persisting in our food supply do not present a hazard to preschoolers. It should take no longer than 1 year for EPA to set new, protective tolerances for each of the 23 chemicals in this report.

2. EPA Should Swiftly Reassess and Reestablish Tolerances for All Pesticides for Which EPA has Requested or Received New Health and Safety Data. For Pesticides Which Are Only Now Being Studied for Health Effects, EPA Should Never Take Longer Than One Year After Receiving New Studies to Establish Appropriate New Tolerances.

Pesticides in food are legal up to the tolerance level. Yet, residues are not necessarily safe in those amounts, or, as this report illustrates, even at levels well below tolerance. This situation has resulted in part because most pesticide tolerances were set in the absence of reliable and complete data on the effects of long-term exposure. In fact, many existing tolerances were established by USDA prior to EPA's existence and were set with great deference to the economic interests of growers. Because the health effects of chronic low-level exposure were generally unknown, tolerance levels often only reflected residue levels resulting from growers' historical uses. Tolerances were routinely set high, so that crops subjected to the most frequent and most concentrated permissible pesticide treatments could legally be sold. EPA inherited these old tolerances from USDA when it was created in 1970. Unfortunately, many of these old, high tolerances still remain on the books. Tolerances are not systematically reassessed and revised as EPA receives new data indicating the potential of pesticides to cause cancer and other chronic effects.

This situation is exacerbated by the fact that even today, only a handful of the approximately 300 pesticides legally used on food have adequate, full data on their threat to human health from chronic dietary exposure. Amendments to the Federal pesticide law enacted in September 1988 will require pesticide manufacturers to test their products fully in the next few years and EPA to reassess the safety of chemicals completely within 9 years. Tolerance revision should occur immediately when EPA learns of new or higher risks than were assumed when the legal limit was initially set.

3. EPA Should Ensure That the Most Exposed and Most Vulnerable Members of Society—Infants and Children—Are Adequately Protected From Pesticide Residues.

EPA's pesticide risk assessments and the resultant regulatory decisions assume an "average" diet. However, virtually every individual's diet deviates considerably from that of an average American's. Most people eat high quantities of certain foods and avoid other foods altogether. The consequence is that EPA's pesticide tolerances are designed to protect the theoretically average consumer—not the actual person

who eats an apple, or two, a day. Consun ers who eat higher quantities of any food than EPA considers to be average are not necessarily protected by EPA tolerances from developing cancers or other diseases caused by pesticides remaining on food.

As this study well illustrates, EPA's reliance on the average diet is particularly inappropriate for preschoolers. For example, the average preschooler consumes almost six times as much fruit, five times as much milk, and almost three and a half times as many grain products per unit of body-weight as the average adult woman.[5] The difference for specific foods is often much greater. Clearly, children are not "average" consumers. Pesticide limits should be set to protect children and other "nonaverage" eaters. EPA should revise existing tolerances and establish new tolerances, based on the unique dietary intake of preschoolers and any other especially vulnerable or highly exposed subgroup of the population.

4. EPA Must Revise Exposure Estimates. Potential Exposure at the Legal Maximum—the Tolerance Level—Should be Assumed When EPA Conducts Risk Assessments.

EPA has not routinely lowered tolerances upon a finding that the legally permissible concentrations of pesticide residues would cause high risk of cancer or other adverse effects. EPA often dismisses these findings by stating that residues are normally below tolerance levels, but EPA often fails to lower the tolerances to what it has declared to be the "normal" level. Consequently, people may unwittingly consume foods that, although legal, contain pesticide levels which EPA's data demonstrate to be unsafe.

Legal food should be safe food. Without prohibitively expensive chemical analyses of all food, consumers cannot identify which foods bear high residues and which have lower, safer concentrations of pesticides. Therefore, EPA should ensure that consumption of food with residues at the legal maximum is safe. EPA should perform risk assessments based on the assumption that pesticide residues will be present at the maximum legal concentration. If growers or the food industry believe that such a risk assessment overstates the risk, they should demonstrate that actual residues are less and petition for a lower legal limit.

5. EPA Should Use the Most Current Information on Dietary Consumption Estimates to Set All New Tolerances and Should Revise All Existing Tolerances With These More Accurate Data.

EPA defends many old tolerances and even sets some new tolerances by reference to consumption estimates which tend to underestimate human dietary exposure. EPA's outdated consumption estimates ("Food Factors") presume that people eat no more than 7.5 ounces annually of many common foods including almonds, avocados, blueberries, cantaloupe, eggplant, honeydew melon, mushrooms, nectarines, and tangerines. These estimates greatly understate preschooler dietary consumption. For instance, preschooler intake of cranberries is 14 times greater than the comparable Food Factor, grape consumption is six times greater, apples and oranges approximately five times greater, apricots almost four times greater, and strawberries almost three times greater.

EPA now has more accurate data on food consumption based on a 1977 USDA dietary survey, when they incorporated into the Tolerance Assessment System (TAS). EPA began using TAS in the fall of 1986 for extremely limited purposes. The TAS data have not been used to revise one single older tolerance initially established with the outdated Food Factors. Furthermore, the TAS data are now almost a decade old and American dietary habits have changed in the interim. For example, preschoolers' consumption of fruits and vegetables has increased 30 percent, and fruits alone by as much as 45 percent, between the 1977 and 1985 USDA dietary surveys. In addition, TAS can be used to examine the dietary intake of subgroups of the population, such as preschoolers. However, EPA primarily utilizes the TAS data on average adult consumption. EPA should immediately update TAS with the most current dietary intake data. All EPA tolerances, existing or new, should be established on the basis of TAS, with specific consideration of preschooler consumption patterns.

6. EPA Must Ensure That Cumulative Exposures to a Variety of Pesticides in Foods, in Drinking Water, and in Our Homes are Considered When Tolerance Levels are Set. It is the Cumulative Risk Which the Actual Person Experiences, and That Risk Must be Minimized.

EPA's pesticide tolerances do not now ensure that exposures to all legally present pesticides in our food are safe. EPA's tolerance-setting is premised on the obviously

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[5] USDA, Human Nutrition Information Service, *CSFII-Nationwide Food Consumption Survey: Continuing Survey of Food Intakes by Individuals. Women 19-50 Years and Their Children 1-5 Years, 6 pages*, 1985.

erroneous assumption that we are exposed only to a single pesticide over our lifetimes In fact, nearly 300 active ingredients in pesticides are registered for use on food and several may be present on a single strawberry or carrot. In 1984, NRDC analyzed pesticide residues in fresh produce purchased in grocery stores in San Francisco. NRDC found that two or more pesticide residues were present in 42 percent of the samples bearing identifiable residues.[6] Further, in 1985 and 1986, the FDA found almost 7,000 residues of only 23 pesticides on approximately 4,000 samples of common fruits and vegetables.

But when EPA sets a tolerance level, EPA only calculates average risk from exposure to a single pesticide. The reality is that there may be several pesticides, which increase our risks of cancer or neurotoxic effects, present in a single meal. EPA currently fails to ensure that the cumulative risk of eating foods containing many carcinogenic or neurotoxic pesticides is safe.

EPA also should consider that consumers are exposed to many of the same pesticides used in foods in their drinking water and in their homes. An insecticide used to combat roaches in one's kitchen may be inhaled in small concentrations for months to come. When EPA permits the insecticide to be used on food crops, EPA should ensure that the total exposures from uses in the home, in the garden, and in agriculture are at a safe level. EPA should consider the cumulative risk from all routes of exposure to a pesticide when setting tolerances. At a minimum, the agency should factor drinking water exposure to pesticides into tolerances—especially because EPA now has substantial data on pesticide contamination of ground and surface water supplies.

Toxicologists know that in some instances exposure to a combination of toxic chemicals can result in a much higher incidence of cancers or other adverse health effects than would be expected from merely adding the predicted effects of each chemical. For example, smokers who were exposed to asbestos suffered far higher rates of lung cancer than were predicted by simply summing the risks of cigarette smoking and asbestos exposure. Synergistic interactions have been documented between organophosphate insecticides, such as disulfoton, and phosalone, methamidiphos and malathion, and EPN and malathion. Synergism and other nonadditive effects of pesticides have not been adequately studied. EPA should require testing of pesticides which are commonly used in combination for synergistic effects.

In the absence of data demonstrating synergism, EPA should at least consistently assume that the effects of multiple pesticides are additive. In fact, the agency has adopted guidelines for assessing the additive health risk from exposures to chemical mixtures.[7] This approach is a good starting point for determining the health effects from simultaneous exposure to several pesticides. Although difficult to consider in establishing tolerances, synergism should not be dismissed by EPA as it could have serious health consequences. This is particularly true for exposures to organophosphates. EPA should explore methods to factor consideration of synergism into pesticide regulatory actions.

7. EPA Must Prohibit the Use of Dangerous "Inert" Ingredients in Pesticides.

EPA's current tolerance-setting procedure also ignores the risks posed by the so-called "inert" ingredients in the pesticide. Inerts are chemicals used to carry, dilute, or stabilize the "active" ingredients which effectively weaken, repel or kill the pest. Many of the "inerts" are dangerous chemicals in their own right.[8] Carcinogenic "inerts" include asbestos, benzene, carbon tetrachloride, chloroform and formaldehyde. Neurological damage may occur from "inerts" such as hexachlorophene and lead. EPA's tolerances are based on a clearly erroneous presumption that the "inert" ingredient will not contribute to injury or illness. EPA should prohibit the use of dangerous "inert" ingredients.

8. EPA Must Require Pesticide Registrants to Develop Analytical Detection Methods Which Can be Routinely Used by the Government in Enforcing the Pesticide Laws. Such Methods Must be Swift, Accurate, and Feasible for the FDA Laboratories.

Pesticides should not be used on food if FDA cannot readily detect the residues in food. Without the ability to detect residues at reasonable cost, FDA cannot enforce EPA's tolerances and therefore cannot protect the public from pesticide residues in food.

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[6] Mott, Lawrie and Martha Broad, *Pesticides in Food: What the Public Needs to Know*, NRDC, March 15, 1984.

[7] EPA, "Guidelines for the Health Risk Assessment of Chemical Mixtures," 51 Fed. Reg. 34014 (September 24, 1986).

[8] In 1987, EPA published a list of 57 inerts of "toxicologicalconcern." 52 Fed. Reg. 13305 (April 22, 1987).

EPA should require that registrants of food-use pesticides develop practical methods for detecting pesticide residues. An analytical method should be considered practical only if it can reliably and routinely quantify the level of residue in food with sensitivity sufficient to enforce the tolerance; if it can provide results in less than 8 hours; if it can be conducted with existing FDA laboratory equipment; and if its use costs no more than what is typically incurred by the FDA in using a multi-residue method. A practical method could be an individual pesticide scan. However, broader multi-residue methods should be sought, where feasible.

9. Congress Must Clarify EPA's Authority to Revoke or Modify Tolerances Swiftly When Pesticides in Our Diet are Found to Present Significant Risk. EPA Needs the Authority to Revoke a Tolerance Automatically When Data Needed for Evaluating a Tolerance are Not Submitted According to EPA's Deadlines.

The food and drug law includes glacially slow, cumbersome procedures which EPA must follow when seeking to modify or revoke an old tolerance. Congress must revise these procedures. Even when pesticide makers fail to submit required toxicology data, EPA is unable to immediately halt the use of the chemical on food. Dr. John A. Moore, EPA assistant administrator, stated at a congressional hearing last year that it was likely to take years to remove a pesticide from the market, even when the manufacturers flagrantly violate a data-submission requirement of the law.[9] EPA's supposedly rapid Special Review process to investigate the hazards of dangerous pesticides takes many years. For example, the EBDCs have been undergoing special investigation since 1977.

10. EPA Must Require Systematic Testing of All Pesticides for Their Potential to Cause Neurological Damage.

EPA has not routinely required pesticide manufacturers to investigate the possible effects of pesticides on the nervous system. Even when EPA requires some study of the neurotoxic effects of a pesticide, it asks only for data which indicate at what levels the pesticide causes paralysis and death. Many chemicals are now known to have far more subtle but deleterious effects on the nervous system. For example, studies suggest that exposure to organophosphates and carbamate pesticides before and immediately after birth can cause delays in reflex and sexual development, delays in eye opening, alter nerve transmission function and neuroreceptor development, impair neuromuscular function, alter brain electrical activity, and affect brain structure. EPA needs to know what effects pesticide residues may have on motor coordination, memory, behavior, learning, and intelligence. Neurotoxicity testing should be required for all pesticides used on food, and the testing should evaluate both acute and long-term adverse effects.

B. Legislation is Needed to Ensure That FDA's Program to Monitor for Pesticides in Food is Improved.

Food safety cannot be achieved by EPA reforms alone. The FDA has responsibility to monitor for most pesticides in food. For commodities other than meat, milk, poultry and eggs, for which the USDA has responsibility, FDA enforces the laws concerning food safety.

At least seven major FDA reforms are needed:

1. FDA Must Improve Its Methods to Detect Pesticides in Food.

FDA monitoring for pesticides is inadequate to ensure that residues are legal, let alone safe. Of the 496 pesticides FDA has identified as likely to leave residues in food, FDA's routine analytical methods can only detect 203—only 41 percent.[10] Of the 105 pesticides which FDA considers to pose a moderate to high health hazard, only 58 (55 percent) are detectable using the FDA multi-residue methods.[11] Among the commonly used pesticides which cannot be detected by FDA's multi-residue methods are benomyl, daminozide, the EBDC fungicides and paraquat.[12] Twenty-six of the 53 pesticides identified by EPA as potentially oncogenic for the 1987 NAS report on pesticides in food cannot be detected by FDA's multi-residue method.

2. Pesticide Use Information is Crucial to the Improvement of FDA's Pesticide Monitoring Program. Use Information Should be Required to Maintain a Tolerance.

FDA, with the assistance of other Federal agencies and growers, should develop accurate, detailed pesticide use information for both domestic and imported produce. FDA cannot effectively use single residue analytical methods to supplement the

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[9] Testimony of John A. Moore, assistant administrator for Pesticides and Toxic Substances, EPA, before the House Energy and Commerce Committee, *Regulation of Pesticides Hearing*, June 8, 1987, p. 172.

[10] GAO, *Pesticides: Need to Enhance FDA's Ability to Protectthe Public From Illegal Residues*, October 1986, p. 33.

[11] *Ibid*, p. 36.

[12] *Ibid*, p. 39.

multi-residue pesticide screens because it has very limited information on pesticides used on each crop. FDA chemists would be wasting their time using monitoring methods capable of detecting only a single pesticide unless the Government had fairly solid evidence that the pesticide, in fact, was applied to the crop during growing, storage or transportation.

Even with domestically grown crops, FDA lacks reliable pesticide application records. Often, FDA choice of the monitoring method must be based on educated guesses about what pesticides were likely to have been used. Some pesticide use information can be gleaned from USDA, State agencies, the food industry, and grower cooperatives, but the data vary significantly in comprehensiveness and reliability. According to the Resources for the Future, only nine States prepare pesticide usage reports on most crops, 17 States report only on major crops, and 15 other States prepare usage reports of more limited value.[13]

With regard to imported foods, FDA has even less knowledge about the pesticides which may remain on them. FDA relies heavily on a private pesticide-use database which provides aggregate information for only 12 countries that export produce to the United States.[14] Dozens of other countries ship significant amounts of fresh fruits and vegetables to the United States. Many pesticides which are banned in this country—such as DDT and EDB—are used in agriculture in countries from which we import substantial quantities of fruits and vegetables. Pesticides like omethoate are not registered for use in the United States but are used in other countries on produce which may be exported to this country. Additionally, pesticides which have limited legal uses in the United States may be used on entirely different crops abroad.

3. FDA Must Cut Delays in Analyzing Samples.

FDA must also decrease the time lag between sample collection and release of the results of the pesticide analysis. GAO found that between October 1, 1983 and March 31, 1985, FDA laboratories took an average of 28 calendar days to analyze samples for pesticide residues.[15] Eighty-three percent of 179 illegal samples were not analyzed within the two-day period FDA said was usually needed for intercepting the food prior to sale to consumers.[16] Congress should require FDA to increase the speed of its analyses of food samples, and to ensure that FDA can remove samples with illegal residues from the market before they are sold or consumed.

4. FDA Should Track the Disposition of Foods Bearing Illegal Pesticide Residues.

FDA should initiate a system to track the disposition of all food samples found to contain illegal pesticide residues. In 1986, GAO reported, "In 107 of the 179 cases in which FDA found that food contained illegal pesticide residues, it did not take any action to prevent food from reaching the market because the food had already been sold." [17] According to GAO, in only one of the 179 identified incidents of illegal pesticide contamination did FDA seize all of the illegal food.

FDA should routinely collect and publicly report the agency's disposition of food containing violative concentrations of pesticides. Such information is crucial for assessing FDA's effectiveness at preventing public exposure to unsafe levels of pesticides in food. Such reports would also help Congress judge the adequacy of FDA's sanctions against those responsible for violating pesticide tolerances.

5. Congress Should Give FDA Authority to Detain Domestic Food Shipments Pending Analysis and to Impose Civil Penalties for Violations of Pesticide Tolerances.

FDA should be given greater authority to control interstate marketing of food that contains illegal residues. This should include the right to initiate civil penalties against violators of the food safety laws, and the right to detain food suspected of containing residues pending results of laboratory analyses.

Currently, FDA can only initiate criminal penalties against violators. The severity of these sanctions and the heightened burden of proof requires the FDA to expend considerable resources and staff to support the charges. Consequently, FDA rarely takes legal action against violators. In the majority of cases an appropriate sanction

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[13] Gianessi, L. and C. Puffer, Resources for the Future, "TheAvailability of State-Level Pesticide Use Data: A Status Report," November 1986, Table I.

[14] FDA's pesticide use information is primarily based on the Battelle World Agrochemical Data Bank. The Battelle data are limited to the following 13 countries: the United States, Japan, India, Brazil, France, Italy, Indonesia, Spain, South Korea, Mexico, South Africa, Turkey, and Egypt.

[15] GAO, *Food and Drug Administration: Laboratory Analysis of Product Samples Needs To Be More Timely*, September 1986, p. 3.

[16] GAO, *Pesticides: Need to Enhance FDA's Ability*. (*Op. cit.*, note 6, p. 53.)

[17] Ibid., pp. 47-48.

would be significant civil penalties imposed against firms or individuals producing or shipping food with illegal residues in interstate commerce.

FDA also needs explicit authority to detain domestic food shipments suspected of containing illegal residues until the analytical results have been obtained.[18] Without this authority, FDA frequently cannot prevent human dietary exposure to unsafe pesticide residues. Often, the contaminated food has already been consumed before final laboratory results are available.

6. FDA's Pesticide Monitoring Resources Must Be Enhanced.

FDA's monitoring program has suffered from substantial staff cuts during the Reagan Administration. In 1980, FDA allocated about $12.7 million and 344 staff years to monitoring for pesticides. In 1985, despite the greater dimensions of the problem, pesticide monitoring consumed $13.7 million and only 309 staff years.[19] Resources available to the FDA's pesticide monitoring program need to be increased.

7. FDA Should Require Food Retailers to Label Fresh Produce with the Country of Origin. Interested Consumers Should be Able to Obtain Information on the Pesticides Used on Any Commodity Offered For Sale.

It is impossible for consumers to take action to limit their exposures to pesticides unless they can find out what pesticides were used in growing and storing the fruits and vegetables in their grocery stores. Consumers have a right to know about the pesticides used on foods they purchase. Grocery store managers should have information about the pesticides used in growing, storing and transporting the produce offered for sale. Food retailers could now require produce suppliers to provide information on pesticide use. Moreover, current Federal law requires that pesticides applied to produce after harvest be identified on the shipping container. Concerned citizens should be able to review these types of information. In addition, the Federal Food, Drug and Cosmetic Act should be amended to include a provision giving consumers a right-to-know about pesticides residues in food. Under such a provision, FDA would be required to obtain data on pesticide usage on food crops and make this information available to the public on request.

Because uses of many pesticides which are illegal in the United States occur in other countries, consumers should be informed when they are purchasing produce from abroad. FDA statistics indicate that imported fruits and vegetables have a consistently higher rate of violation of the U.S. pesticide laws. In fact, between 1979 and 1985, the pesticide residue violation rate for domestically-grown commodities averaged 2.9 percent whereas the violation rate for imported commodities averaged 6.1 percent.[20] If this trend continues, consumers may expect imported fresh produce to be twice as likely to violate the pesticide laws as domestic fruits and vegetables. FDA should require country-of-origin labelling so that consumers can immediately identify imported fruits and vegetables, which have become an increasingly large segment of the produce consumed in the U.S.

C. Congress Must Act to Assist Growers to Reduce Pesticide Residues.

In addition to more effective EPA and FDA programs to regulate pesticides, the food supply will be best protected if growers are provided incentives to reduce their use of pesticides. Many farmers are willing to consider techniques that decrease pesticide applications, but barriers exist to the adoption of these methods.

Six basic reforms in farm policy, at minimum, are necessary to encourage growers to reduce pesticide use.

1. Congress Should Provide Credit Assistance, Crop Insurance, and Other Financial Protection for Growers Who are Changing From Conventional, High-Chemical Agriculture to Innovative, Low-Residue Techniques.

Most farmers know pesticides are costly and dangerous. Nevertheless, many growers are reluctant to modify their farming practices because of the financial risks involved. Alternative techniques such as integrated pest management (IPM) and organic farming can be used to reduce greatly or even eliminate pesticide residues in many crops. Instead of routinely spraying fields with herbicides, insecticides, and fungicides, IPM growers monitor their fields for pest infestations and use control measures only when they determine that the pests have reached an economically damaging level. IPM and organic growers both rely on a variety of techniques to limit pest infestation, many of which do not entail the use of any chemicals. Generally, organic growers apply no synthetic pesticides. IPM growers may use some syn-

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[18] FDA now only has the authority to detain imported food, pending results of its analysis for pesticide residues.

[19] GAO, *Pesticides: Need to Enhance FDA's Ability.* (*Op. cit.*, note 6, p. 12-13.)

[20] GAO, *Pesticides: Need to Enhance FDA's Ability.* (*Op. cit., note 6, p. 25*), and GAO, *Pesticides: Better Sampling and Enforcement Needed on Imported Food*, September 1986, p. 23

thetic pesticides, but minimize use of chemicals they believe will disrupt the ecological balance of crop, pest and pest predators in their fields.

Although organic farming may ultimately prove profitable for many growers, there may be significant losses during the transition period in which the farmer learns and perfects the new techniques. Particularly for smaller growers who may not be able to survive several hard years, the disincentives to innovate are great.

Congress should assist growers who wish to modify their farming practices in ways that could greatly reduce pesticide use by offering them financial support. Credit assistance, crop insurance and other financial incentives should be provided for growers in transition between conventional farming and innovative, low-pesticide methods.

2. Congress Should Impose a Tax on Pesticides to Fund Demonstration of Farming Techniques That Will Result in Lower Pesticide Residues.

The development of alternative farming techniques to reduce pest problems, while reducing dependence on pesticides, requires research and field demonstration. In 1988, less than $4 million out of USDA's $1 billion annual research budget went toward the Department's new low-input ("sustainable agriculture") research program.

This valuable program and closely related endeavors should be greatly expanded. A tax as small as one percent on pesticide products could raise tens of millions of dollars in revenue. Congress should direct these funds to experiments demonstrating techniques that can reduce farmers' reliance on pesticides and thus limit pesticide residues in food. The 1990 Farm Bill provides an excellent opportunity for Congress to enhance research in IPM and organic growing techniques, funded in part by a tax on pesticide products.

3. Congress Should Establish National Definitions of "Integrated Pest Management" and "Organic" Farming Techniques and Should Establish a National Certification Process for Commodities Grown Using These Techniques.

Consumers dishing to limit pesticide exposures may prefer to purchase products with lower residues grown using IPM or organic farming practices. However, not all States have defined "organic" farming, and those that have, are not always in agreement about the criteria which should apply. In the interest of consumer protection, there should be a national definition of "IPM" and "organic" farming, and a national certification process to ensure that produce identified as "IPM-grown" or "organic" is truly in compliance with the national definitions. Only if Congress adopts such a system will consumers know that purchasing fruits or vegetables certified as "IPM-grown" or "organic" provides the same degree of protection for Georgians and Vermonters as for Californians and Texans.

4. Congress Should Modify Federal Farm Support Programs to Ensure That Growers are Permitted and Encouraged to Use Crop Rotation and Other Pesticide-Reducing Techniques Without Jeopardizing Their Income.

Crop rotation can greatly reduce pest problems, particularly from soil-dwelling pests. However, many growers who qualify for support payments under the current Federal commodity programs risk losing their eligibility, and hence their-income, if they adopt crop rotation. This anomaly of the law must be changed. Congress should ensure that growers do not jeopardize their farm program eligibility by employing prudent, pesticide-reducing farming practices, including rotation of annual crops.

5. Congress Should Ensure That Crop Insurance Policies Do Not Discriminate Against Growers Using Organic or Integrated Pest Management Farming Practices.

Some growers have reported that crop insurance is not available unless they promise to rely on pesticides. The practice of some lenders of making crop insurance available only to conventional growers creates a dilemma for growers who wish to develop alternative farm practices that could decrease pesticide residues in food. Growers should not be penalized for their innovations in reducing pesticide residues. Congress should ensure that Federal crop insurance policies do not discriminate against IPM or organic growers.

6. Congress Should Legislatively Modify Agricultural Supply-Control Systems to Ensure That They Do Not Demand Cosmetically Perfect Produce Which Require Excessive Pesticide Use.

Currently, marketing and grading standards are developed by the agricultural industry to regulate the quantity of produce offered for sale in this country. Such standards normally require commercial fruit and vegetables to meet very detailed color, size, shape and texture criteria. Fruit or vegetables which may meet these rigorous cosmetic standards may be neither the best tasting nor the most nutritious produce. Supply-control systems should reward nutritionally exceptional produce, not produce whose "perfect" appearance is achievable only by reliance on pesticides. Consumers should be informed that uniform color or size is not ordinarily correlated

with nutrition or taste. Congress must modify the supply-control system to ensure that growers are rewarded for food which is good to eat, thereby removing incentives for growing good-looking, but pesticide-laden food.

NRDC thanks the committee for your concern about the risks posed by pesticides in children's food. We hope to work closely with you to improve the safety of the Nation's food supply by reducing pesticide use in agriculture. We'll be happy to answer any questions.

Senator ADAMS. I am not going to be able to allow the panel to have as many questions as I would like to ask, and I will instruct staff that we will submit some in writing if that is acceptable, because I do want to hear the other panel.

I have one question, though, which obviously just has to be asked with this panel being here; I cannot have you leave without posing it. That is, Ms. Hathaway, you say it is absolutely unacceptable and dangerous regardless of the numbers that are used, based on the data, and you have counsel with you who has filed a lawsuit on this. And Mr. Wylie, you say this product is not dangerous. I am not going to ask you, Dr. Jackson, unless you want to put yourself in the middle of it. But Mr. Wylie, I would like to have you first comment—and I do not pretend to be a chemist, but I understand residual, and then I understand residual effects—would you comment first, and then Dr. Jackson, I will come to you.

The charge has been made. How do you respond?

Mr. WYLIE. Senator, we all have the same deep-rooted concern.

Senator ADAMS. And you all have the same data, I understand, too, don't you?

Mr. WYLIE. But we sure do not use the same data. And if that points out one thing that the very qualified Dr. Young spoke about this morning, it is that this science is so complicated, so deep, so involved—and my learned table associate here can certainly confirm this—that the regulatory process is not burdened and slowed down because the EPA or the crop protection companies or the independent scientific advisory panel or any other noted scientist wants to bog it down. It is because the science is so complex, the issues cannot be resolved in the media, and with all due respect, it takes a great deal of analysis and thought, and science is not black and white.

So the issue that you see here is because there is a difference of opinion even within the scientific community that so strongly supports the safety of our food products today.

We have independent laboratories and independent scientists who act as consultants, who in some cases are ex-EPA toxicologists, and in one case is an ex-SAP panel member—and by the way, they did not consult for us when they were members of the SAP, and I think it is important to point that out. But clearly, there are two interpretations of this scientific data.

I criticize the NRDC report not because of the intent of that report—we all have the same intent—but the fact that it was based on data that was flawed, and there were conclusions reached in that report—and I will give you one specific example. They claim that the data showed that Alar and UDMH were mutagens. Uniroyal conducted at independent laboratories under EPA-approved protocol and EPA-audited facilities, nine mutagenicity tests over the last 10 years, the last of which was submitted and accepted by

the EPA in 1988. Every one of those tests concluded that the products were not mutagens.

So a perfect example. Ms. Hathaway had some very important comments to make, and a lot of those are valid comments, and we do not disagree with those. But any soundly-based scientific peer review and literature search would have uncovered data that is a matter of public record and in some cases in the *Federal Register*. They cite current data as recently as 1986, 1987, and there are quotations in that report dated February 1989, but they do not cite the fact that the daminozide tests, long-term chronic tests that were complete last year in both mice and rats, proved no carcinogenicity. It does not cite that the interim test results on UDMH in rats showed no carcinogenicity, and that in mice, in all doses except the very highest dose—which is equivalent to 4 million times human exposure, and if you want to extrapolate that into what it means to a preschooler, that preschooler would have to drink 19,000-plus quarts of apple juice a day each and every day of their life—and we are not saying you are going to feed anybody that massive dose, but if you use flawed technical data relative to the determination of carcinogenicity or mutagenicity, no matter how accurate your market basket data is, you are going to come out with an unscientific result.

Ms. HATHAWAY. Senator Adams.

Senator ADAMS. Go ahead, Ms. Hathaway.

Ms. HATHAWAY. I am not sure that Mr. Wylie has really carefully reviewed our study, because our study did not assert that there was any risk of cancer at all from the product daminozide itself, only from the breakdown product.

Senator ADAMS. I understood that, and that was why I asked him that question.

Ms. HATHAWAY. That's right. But what he responded with is the fact that we were not citing certain data that has come in recently on daminozide's cancer potential. No. The reason is because we only looked at the UDMH, the breakdown product, cancer potency. And it is Uniroyal's own data from interim studies that were submitted to the agency in 1988 that led the Environmental Protection Agency to do a risk analysis that concludes that the risk from UDMH is 45 times what EPA says is an acceptable level of cancer risk in our food supply.

Now, it is Uniroyal's own laboratory study from which EPA performed that risk assessment. It is Uniroyal's own market basket survey, and yet Uniroyal is saying that somehow we are causing hysteria. I do not understand that point. I think we are using the very best available data that is out there. In fact, the only completed studies on UDMH were the basis of the NRDC risk assessment. EPA is using Uniroyal's halfway point results and calculating a risk and finding it, too, is showing an intolerable cancer risk.

So it seems to me that Uniroyal has a problem on its hands. It does have a chemical that seems to be coming out carcinogenic, whether you look at Uniroyal's data, National Cancer Institute's data, the U.S. Air Force data, or what-have-you.

Senator ADAMS. Dr. Jackson, you were going to say something. UDMH is the third down the chain here now. Were they using too much of that quantity?

Dr. JACKSON. I was simply going to come to some sort of sum-up about what you actually say to parents and I say to my fellow pediatricians when they call me. So I'll let them argue this one over, and then I will sum up.

Senator ADAMS. I do not have the time to allow them to do this at great length. I want to let counsel say something, but then I will close with you.

Yes, Mr. Meyerhoff.

Mr. MEYERHOFF. I would like to add just one point. We are talking about Alar; we are talking about the burden of proof; we are talking about the fact that everyone who has looked at UDMH, the Air Force, the University of Nebraska, the EPA scientists, Uniroyal's own scientists, have found tumors. What do you do in that situation? Does the public take the burden, or does the chemical company have to prove the safety of the product?

But in the much larger sense, I think the issue here is not apples, it is not UDMH—although I noticed that Senator Symms for the record ate an Alar-free apple, which was a choice that perhaps a lot of children in this country have not had. But over the past 10 years, I think the issue is EPA. In 1983, 90 percent of the milk supply in Hawaii had to be destroyed because of heptachlor. In 1984, ethylene dibromide, a potent carcinogen, finally gets canceled after 10 years of Government foot-dragging. In 1986, one million watermelons in California were sold with an illegally-used temed—thousands of people got sick, many women lost their children in miscarriages.

We have a failure of the Government policy here. If there is a lesson in all of this—and I have been the head of the NRDC Pesticide Project for nearly a decade now—it is that we cannot trust these Government agencies to ensure a safe food supply. We have had one debacle after another.

I think what Jack Moore said this morning about the fact that the data now is coming in—for many years, Government and industry benefited from their ignorance about what these chemicals do, and they did not have to act. Now, because of the FIFRA Amendments, the data is coming in, and it is coming in carcinogenic. Unless the Congress acts to change the rules and give the Government the power—I think they have the power now, and that's why I am suing them, but to make it very clear that they have the power and the duty to ban these chemicals so the burden is not on the public, it is not on our children, but it is on the industry, it is on the chemical companies as it should be.

Senator ADAMS. Dr. Jackson.

Dr. JACKSON. I concur with Mr. Wylie that this issue is extremely complicated. In fact, the National Academy of Science is immersed in just trying to follow up on the whole issue as commissioned by the Congress and by the Canadian Ministry of Health.

When I get calls—and I have been deluged by calls—from pediatricians and parents about what to do, my recommendation is what we have always told parents in terms of fruits and vegetables, and that is give your kids plenty of fruits and vegetables, but don't give them a lot of apple juice. The academy has been strongly against the use of any juices because of their acidic solution, sugar solutions, to be put in baby bottles; don't give them in baby bottles.

Limited amounts would appear to present a remote and theoretical risk. And given the fact that the marketplace has taken care of a large amount of the problem, that is, by reducing the prevalence of the use of the chemical, No. 1, and No. 2, the fact that children really should not be drinking huge amounts of the juice anyway, and the amount of apples they would be consuming would be limited.

I do not see that for an individual in an individual case that you are dealing with a significant case for that individual. So I will take the position there that I do not want to alarm the parent, who has been doing the best to feed that child what they can, but we do want to see Government get this product out of the food supply so we are not dealing with an ongoing risk in the future.

Senator ADAMS. Thank you all very much. I am going to have to go to the next panel. I appreciate your being here. If you wish to submit additional comments in writing, I would be happy to have you do so, and I am sure that all of you can walk right outside and present to the media your side. That is fine by me.

The final panel includes Mr. John Rice, chairman of the International Apple Institute; Mr. Robert Josephy, Blue Jay Orchards, Bethel, CT; and Mr. Charles Carey, president of the National Food Processors.

Welcome, gentlemen. The committee is pleased to receive your testimony. I will repeat what I said to the prior panel. If you have full written statements that you wish to submit, the chair will receive them in full, and they will appear as if given. You may summarize, or if you prefer to read your statement, the chair will hear it.

I will state that we have approximately 20 minutes more that we can go through this, so if you wish to submit additional written things, you may do so. I say that so that your sentences will be in short, 20-second bites that we can all understand and will live in posterity.

Mr. Carey, since you are in the middle, it is a pleasure to welcome you here today. You are the president of the National Food Processors Association. The chair would be pleased to hear from you at this time.

STATEMENTS OF CHARLES J. CAREY, PRESIDENT, NATIONAL FOOD PROCESSORS ASSOCIATION; JOHN RICE, CHAIRMAN, INTERNATIONAL APPLE INSTITUTE OF AMERICA; AND ROBERT JOSEPHY, BLUE JAY ORCHARDS, BETHEL, CT

Mr. CAREY. Thank you, Senator.

In the interest of time, let me try to summarize. We have submitted a statement. I would like to note two corrections to be made on that statement, two typographical errors on page 3, which we have given you separately, but in the copy that was distributed when we came into the room, it was the one we submitted last night, and it is uncorrected. There are two dates on page 3 that I will correct.

Senator ADAMS. Without objection those will be corrected in the record, and you may submit them to the Members of the staff in order to do so, Mr. Carey.

Mr. CAREY. Let me summarize first by explaining that our organization, the National Food Processors Association, which does represent most of the food processing companies in the industry, has a scientific base. We operate three research laboratories with over 100 scientists. And we have done a great deal of work in pesticides over the years. As a matter of fact, one of the points that I make in my statement is that out of our scientific research was developed back as far as 1960 what is called the Protective Screen Program, which is a program developed to ensure that raw agriculture crops grown for processing do not contain illegal residues.

In the statement, we outline the elements of this Protective Screen Program, which has been in effect for many years and is followed universally by food processors. It is, of course, geared to the tolerances and the regulations established by the Federal Government, the agencies charged with the responsibility of ensuring the safety of the food processing industry for the public.

In addition to the Protective Screen Program, which assures that the Federal regulations are met in the raw products that we produce, the processors themselves take additional steps to assure the safety of their food.

Since 1959, as we say, we provided information on pesticide regulations to the industry; laboratories have analyzed for the products; and in the past several weeks, during the controversy that has been surrounding the release of the Natural Resources Defense Council report, we feel that the industry has been hurt by the perception that has been created in the public mind that the food supply is at risk of being unsafe, when in fact it has never been safer.

I think it is particularly unfortunate that NRDC has called into question such products as apple juice and applesauce, which are so commonly consumed by children. The safest food in the world is the food produced by baby food manufacturers in the United States. They go to extraordinary lengths to assure the safety of their products.

To put this issue in proper perspective, and particularly with respect to the Alar, daminozide, that is under discussion, let me review some of the points that pertain to this.

In 1986, when the EPA began its special review of daminozide, apple processors began immediately to eliminate the use of raw product containing it that had been treated with it.

By 1987, most NFPA members and all baby food manufacturers had voluntarily begun a practice of not accepting apples treated with daminozide and had so informed their growers.

Most of the processors, certainly the larger processors, have installed their own equipment with which to test incoming raw product to make sure that despite their instructions to their growers that these instructions are not overlooked.

In light of the NRDC report, we conducted an informal survey after the "60 Minutes" show of more than 100 companies in the industry and found virtually total compliance with the practice of not accepting apple products with detectable traces of daminozide.

Using the official analytical method of the Food and Drug Administration, the so-called PAM-2 method, we ourselves in our own laboratories and from the laboratories of our member companies

have collected 3,801 samples of apple products and found only one with a residue level above one part per million. And of course, that one part per million is the level that was set by Massachusetts. It is still far lower than the level that is established by EPA at 20 parts per million. But only one out of 3,801 samples.

I might say that this information was released to the press, to the "60 Minutes" show; it was ignored by the media, but it is the result of extensive testing that has been done regularly over the years.

We have pointed out some of the problems we have with the best methods used by Consumers' Union on that show. Specifically, they have used a test method which purports to measure extremely low levels of trace elements of daminozide which may not be detected by the standard test method. That particular test method has never been validated by interlaboratory and it has not yet been officially accepted. Whether it will be validated by interlaboratory testing remains to be seen. But certainly, the trace levels which claim to have been found by this method are so minute as to have no public health significance.

In summary, we believe that the food industry has acted responsibly in response to consumer concerns. Even though Alar is still a legal substance and not a scientifically proven carcinogen, the food processing industry has already voluntarily discontinued its use on raw products for over 2 years, of any products that are treated with that chemical.

The food industry has cooperated with FDA and EPA in the implementation of their regulations, and it has taken steps on its own initiative to give extra assurance to the public that the food products that we produce are safe.

Thank you.

Senator ADAMS. Thank you very much, Mr. Carey.

Mr. CAREY. I would like to submit in addition to our statement—after the NRDC report was prepared and released, we sought out a consulting toxicologist to review that report and review the risk assessment techniques that were employed. The report that we have just gotten back is rather critical of the techniques that they have employed, and we would like to submit this for the record.

Senator ADAMS. Without objection, that will be included in the record immediately following your statement and as part of the record.

Thank you, Mr. Carey.

[The prepared statement of Mr. Carey (with attachments) follows:]

PREPARED STATEMENT OF MR. CAREY

My name is Charles J. Carey. I am the president of the National Food Processors Association and I appreciate the opportunity to testify on behalf of the members of my association. Since 1907 the National Food Processors Association (NFPA) has represented food canners and food processors whose membership numbers nearly 600 throughout the United States. Included are food processing firms that supply a major portion of the Nation's food supply. Most of our members process and package the fruits, vegetables, meats, fish and other specialty food products we eat everyday. Additional members manufacture processing, packaging equipment and supplies.

As a basis for providing regulatory and legislative representation for our members, NFPA maintains and operates three food processing research laboratories where over 100 scientific personnel conduct studies on food safety, nutrients and innovative technologies for food preservation.

Out of the scientific research that we have done was developed a Pesticide Protective Screen Program that NFPA initiated in 1960. This voluntary program outlines procedures for food processors to follow to ensure that raw crops grown for processing do not contain illegal pesticide residues. The program emphasizes prevention of contamination. If pesticides are used properly and in accordance with label directions, any residues on the raw crop will be within legal limits judged to be safe by the Environmental Protection Agency.

The program provides that food processors should:

1. Cooperate with universities, agricultural groups and government agencies to develop educational and training programs on proper use of pesticides;
2. Ensure that growers are aware of restrictions placed on use of pesticides;
3. Ensure that only registered pesticides are used, and then only in accordance with label directions;
4. Ensure that residues that remain on raw commodities are in compliance with applicable regulations; and
5. Ensure that by-products from processing operations that go into animal feed do not contain illegal residues.

The NFPA program provides that food processors may limit grower use of pesticides and require growers to maintain records of pesticide use in crops.

Each processor is to develop a monitoring system based upon its requirements for raw materials and ingredients. In addition, processors may sample finished products for residues.

Since 1959, NFPA has provided information on pesticide regulations to the food industry. The Association's laboratories have the capability to analyze for pesticide residues, and collect and tabulate residue data from members and others.

The events of the past several weeks surrounding the controversy of the Natural Resources Defense Council's report on pesticides in our children's food has left the perception that the Nation's food supply is at risk of being unsafe when in fact it has never been safer. NRDC's efforts to sensationalize the results of their study has created in the public's mind an unwarranted fear as to the safety of the food supply and a mistrust of the Federal government's regulatory system. While FDA and EPA may not be perfect, we think they do an effective job of regulating the Nation's food supply. Their efforts, coupled with the quality and safety control programs of food processing companies combine to make this Nation's food supply the safest in the world.

It is particularly unfortunate that NRDC has called into question products such as apple juice and applesauce which are so commonly consumed by children. The safest food in the world is the food produced by baby food manufacturers in the United States. They go to extraordinary lengths to assure the safety of their products.

To put this issue in proper prospective here are some important facts:

1. In 1986, when the EPA began its special review of the compound daminozide (Alar) apple processors began efforts to eliminate its use immediately.
2. By 1987 most NFPA members and all baby food manufacturers had voluntarily begun the practice of not accepting apples treated with daminozide and had informed their growers not to treat apples with this particular substance. Most processors installed equipment in their own plants to routinely check shipments and ensure compliance.
3. In light of NRDC's recent report critical of EPA's failure to suspend the use of daminozide NFPA conducted an informal telephone survey of more than 100 companies and found virtually total compliance with the practice of not accepting apple products with detectable traces of daminozide.
4. Using the official analytical method of the Food and Drug Administration, NFPA collected 3,801 samples and found only one with a residue level above one part per million which was well below the EPA tolerance, or approved residue limit for daminozide of 20 parts per million (ppm). This information was released to the press, including "60 Minutes," before the NRDC report was released and was ignored by the media.
5. During the "60 Minutes" story a representative of the Consumers Union presented data showing that daminozide was detectable in processed apple juice and applesauce. The test method used by Consumers Union is one that has never been validated by interlaboratory testing or officially accepted. The trace levels which they claim to have found by this method are so minute as to have no public health

significance. The EPA acceptable tolerance is 20 ppm. The Consumers Union test results announced on the "60 Minutes" broadcast concluded that daminozide was detectable in 23 of the 32 samples but failed to point out they were in the range of .02 to .53 ppm, which is far below the officially accepted tolerance.

We believe that the food industry has acted responsibly in response to consumer concerns. Even though Alar is still a legal substance and not a scientifically proven carcinogen, the food processing industry has already voluntarily discontinued its use of raw products treated with this chemical. The food industry has cooperated with FDA and EPA in the implementation of their regulations and it has taken steps on its own initiative to give extra assurance to the public that the food we produce is safe.

PRELIMINARY COMMENTS ON NRDC'S REPORT: "INTOLERABLE RISK: PESTICIDES IN OUR CHILDREN'S FOOD"

Summary Comments

SRS International has been requested by the National Food Processors Association to review and comment on the recent report issued by the Natural Resources Defense Council (NRDC), "Intolerable Risk: Pesticides in our Children's Food" [NRDC, 1989].

The thrust of the NRDC report appears to be:

(1) Present use of pesticides in production agriculture is leading to residue levels in food which exceed the Allowable Daily Intake (ADI) by many-fold, especially in children ages 1-5;

(2) That some 57 percent of total possible cancer risk from dietary pesticide residue exposure accrues during the first 5 years of life in a lifetime of continuous exposure and that EPA's risk assessment methodology does not account for this, thus leading to risk estimates which are too low;

(3) That EPA's possible cancer risk estimates are too low in any case due to No. 1, above;

(4) That children are at significant risk of neurologic damage from organophosphate pesticide residues due to No. 1, above; and,

(5) In the particular case of Alar (daminozide), the risks from consumption of apple derived foods is very high at present, particularly in children.

The bottom line, as it were, in the NRDC report is that the U.S. food supply is not safe at present, particularly for children ages 1-5 and that the U.S. EPA is not doing its job in regulating pesticides to assure that their use in production agriculture is consistent with food safety.

At the outset, we must note that there is insufficient detail in the NRDC report to allow a reviewer to completely reconstruct what NRDC has done. There are no raw data or summaries of raw data, there are no sample calculations. As such, the report released can not be taken as being a "scientific report" in the normal sense of the word. It is also far from clear how the document in its present form could have been meaningfully peer reviewed.

None-the-less, it is possible to reconstruct the general framework of how NRDC reached its conclusions and the nature of assumptions made by NRDC in reaching these conclusions.

On such a review of the NRDC report, it becomes apparent that the methods and assumptions used by NRDC are so seriously flawed as to render the present report useless as a basis to derive any meaningful conclusions as to the safety of the U.S. food supply or of the effectiveness of EPA's regulatory program.

The basic conclusions of the NRDC report rest on stringing together a series of improbable "worst case" assumptions and/or speculations. These include speculations and/or assumption as to: Increased sensitivity of children to pesticides; levels of food intake; pesticide residue levels in foods; and, the science of risk assessment. In all of these areas, NRDC has either gotten its facts wrong or has made methodological errors. Many of these assumptions and/or speculations are put forward in NRDC's report as being widely accepted and appropriate. In many cases, they are put forward as being derived directly from Federal agencies. In the manner employed by NRDC, these assumptions and/or speculations are not widely accepted or utilized, nor are they a correct representation of regulatory practice in the U.S. or world-wide.

NRDC, in this report, has consistently drawn inappropriate conclusions as to dietary intake of pesticide residues, the magnitude of potential cancer risks associated with residues of some pesticides, the cancer causing potential of some of the pesticides it has considered, and the protectiveness toward children of EPA's risk assess-

ment methodology. In that the NRDC report focuses on fruits and vegetables, the flawed nature of this study is particularly relevant since this is a time when health authorities are trying to educate the public of the importance of increasing the amounts of fruits and vegetables in the diet so as to improve general health and lower the risk of heart disease and cancer.

Briefly, NRDC's report offers no good evidence (and the data often point in a direction opposite to that taken by NRDC) that: Children are uniquely sensitive to pesticide residues compared to adults; that (when adjusted on a consistent exposure basis) pesticide residue intake in children is higher than in adults; that intake of pesticide residues exceeds the Allowable Daily Intakes; that intake of pesticide residues is as high as estimated by NRDC; that some pesticides called carcinogenic by NRDC are in fact so; that EPA's risk assessment methodology is not protective of children; and, indeed, that current intake levels of various pesticide residues pose a significant actual hazard to health.

It appears that among the major errors made with regard to dietary intake of pesticide residues is assuming that one can simply add up all of the various foods in the survey data NRDC has used. This is inappropriate, since these types of data are averages for 3 or 4 day consumption periods and a person does not eat all of the possible foods considered on each and every day. This sort of error is what leads to NRDC's curious conclusion in Table A3-3 of the report, that children of less than 1 year's age consume daily over one-half pound (some 60 percent of their daily diet) of fruits, vegetables, and juices. This does not leave much room for cereals, grains, milk, and meats. On top of this, NRDC assumes that residues in raw produce as it leaves the farm equate to residues in produce or in processed foods on the table. This is simply not so and introduces a very large error into NRDC's calculations. Overall, NRDC's errors in assumed pesticide residue intakes provide, at the minimum1 a 10 to 100 fold overestimate of risk for the various pesticides discussed in the NRDC report.

The cancer risk assessment preferred in the NRDC report is particularly suspect since it involves a sort of "back engineering" of the constants in one (not widely used) risk extrapolation model on the basis of constants derived with another, structurally noncomparable model. Since NRDC has not done so, we can not tell, at the current level of analysis, what the risk estimates would be if NRDC had, as is considered proper practice in risk assessment, fitted their model to the actual animal bioassay data. Neither can we judge, at the present level of review (since no actual modeling of animal data was performed by NRDC and since we have not independently done so) whether or not NRDC's model is an appropriate model for fitting the data on any of the specific pesticides which NRDC has considered. Thus, the "risk estimates" which NRDC has generated can not be compared, in the way NRDC has done, with risk estimates generated by EPA and, by themselves, tell us nothing as to whether any possible risks are significant or not on the sort of risk scale which risk assessors use (which is not, contrary to the NRDC report's implication, an actuarial risk scale).

In the specific case of Alar (daminozide), NRDC has done it's back-engineering of their model on the basis of an out-of-date potency constant for the break-down product UDMH. This potency constant was based on data acknowledged to be flawed and inappropriate for purposes of risk assessment. This error alone is expected to lead to at least a 10-fold over estimate of risk from UDMH exposure.

Specific Comments

Differential sensitivity of the young

NRDC claims that the young are far more sensitive to the adverse effects of chemicals than adults. With respect to potential carcinogens a large part of their claim rests on the assumption that the cells of the young are dividing more frequently than those of adults and that cells in the process of dividing are more sensitive to the effects of carcinogens (since the genetic material of the cell is more exposed at the time of division). The rate of cell division is a complex function of which tissue is being considered and age. For example, the human brain has developed by age 1 to 2 from 75 percent to 100 percent (depending on which brain region) of the numbers of cells in an adult brain. Various tissues and organs who's growth and development is under sex hormone control do not fully develop until puberty is reached. In adult cells, as well, there is ample evidence that the normal processes which act to repair or prevent cellular damage, including potential damage to the genome falter compared to their level of activity in the cells of the young. Thus, to State categorically, as NRDC has done, that children are necessarily more sensitive to the action of carcinogens than are teens or adults is a gross oversimplification.

Indeed, in some aspects they may be, but in other they can be expected to be less sensitive. They most accurate characterization would be to say that there is a similarity of sensitivity and that sensitivity would not be different by the orders of magnitude which NRDC implies.

We must point out that the various "examples" of carcinogens which show a greater effect in younger animals or humans which NRDC proffers in Table 3-1 of its report are, for the most part, specious. In most of these examples, the "difference" in sensitivity is within the experimental error in the determination of tumor response and can not be claimed as a difference. In the others, the "difference" in sensitivity is due to the simple fact that the younger animals had a longer time than did adults to develop a tumor before they deceased or were sacrificed. Indeed, the data in this table suggest, that when adjustment is made for amount of time to develop a tumor, that, whether exposure begins in adulthood or very early in life, there is little difference in sensitivity to the carcinogens listed. Rather than supporting NRDC's premise, the data in this table argue forcefully against NRDC's central premise and against the utility of the model they use to estimate the percentage of lifetime risk which accrues during the early life phase of exposure.

With respect to the acute toxicity of pesticides and potential neurotoxic damage, it has been established that adult rats are generally more sensitive to pesticides than are young, growing rats. For 57 pesticides examined in weanlings compared to adults, 18 were more toxic in adults, 4 were more toxic in weanlings, and the balance were similarly toxic (Gaines and Linder, 1986). Thus, some 93 percent of pesticides examined are no more toxic in weanlings than in adults and ca 32 percent are more toxic in adults. This implies that young animals are perhaps more resistant, in general, than adults to the potential toxic effects of pesticides to which they may be exposed.

Dietary consumption and residue intake estimates

NRDC's data base and NRDC's use of its data base significantly overestimates the pesticide residue intake in the diet:

NRDC has failed, for no concrete reason, to include in the residue monitoring data used by NRDC, the data from the FDA San Francisco Regional Lab, which consistently show lower residues on fruits and vegetables than found in other FDA regions. NRDC dismisses these results by stating that this lab "fails to detect residues". Yet, the laboratory in question is conformance with standard protocols and procedures for such residue analyses. It is also located in a region from which a large proportion of U.S. fruits and vegetables derive. The bias introduced by failure to include these data may be very large although we have not quantitated it. Also, NRDC has not indicated in its report how it adjusts for the bias introduced by including samples which are in violation from those which are legal for sale. Also, no attempt was made by NRDC to discern to what extent the violative samples may be over-represented in the residue data base in comparison to legal samples.

NRDC's food consumption data were based on a small 1985-86 USDA survey which had a relatively poor participation. Only 1,127 women and 333 children completed the survey. The dietary consumption of women in the 22- to 33-year-old age range was derived from only 497 women. USDA conducted a much larger survey—in the period 1977-78 of over 30,000 individuals including 2,700 children in the age group 1-5. NRDC's reliance on only a small subset of the total data base create's part of the difference between NRDC's risk estimates and those of EPA (which relies on the larger 1977-78 data base). A much larger problem is that NRDC appears to have misused the consumption data. For example, in Table A3-3 NRDC appears to assume that mean food intakes (for four nonconsecutive days) can be simply added to provide an estimate of daily consumption of all listed foods. This is a completely improper use of such data since a person does not consume all foods on any given day. The frequency with which foods are eaten must also be factored in and it does not appear as if NRDC has done so. In any case, neither the data base used by NRDC or the larger 1977-78 data base are an appropriate data base, when coupled to residues in raw agricultural commodities as NRDC has done, from which to assess the daily dietary intake of pesticide residues in the diet.

This is due to the faulty assumption made by NRDC that the levels of pesticide residues present in processed food and juices is the same as the level found in raw agricultural commodities as they leave the farm gate. This, despite abundant information based on the FDA's regulatory monitoring program and its total diet surveys that this is wrong.

In its regulatory monitoring program, a total of 14,492 samples of domestically produced and imported food were analyzed by the FDA for pesticide residues in 1987. The pesticides discussed in the NRDC report are among those for which FDA analyzes. Of the 1987 samples, 4,178 were fruit samples and 7,345 were vegetable

samples from domestic and imported sources. No residues were detected in 50 percent of these fruit samples and in 59 percent of these vegetable samples. When residues were found, they were usually at low levels and only rarely exceeded established tolerances (less than 5 percent of the samples). Domestic fruit and vegetable samples showed even fewer residues than did the combined domestic/import samples. Domestic fruits showed 50 percent with no residues detected and less than 1 percent with residues over tolerance. Domestic vegetables showed 63 percent of samples with no detectable residues and less than 1 percent with residues over tolerance.

FDA's Total Diet Study provides a direct estimate of dietary pesticide intake. In this Total Diet Study, 230 different food items representative of the diets of U.S. consumers are collected and analyzed 4 times each year. This resulted in 936 samples analyzed. Each sample was tested for over 200 chemicals. In 1987, only 53 pesticides were detected in these foods. Of the 23 pesticides of concern to NRDC, intake data on all but daminozide are reported from the Total Diet Study. Intakes are well below EPA and FAO/WHO ADI's, even for infants (see accompanying Tables 1 and 2).

The National Food Processors Association reviewed data on 20,310 samples of commodities packed between 1980 and 1988 and found that 93 percent of the samples had no detectable residues. None of the samples with detectable residues approached the tolerance level established by EPA. In this study, 17,843 samples of fruits and vegetables were included and from 94 percent to 96 percent had no detectable pesticide residues. These data are in agreement with FAO/WHO data which have consistently shown that the dietary intake of pesticide residues by children are less than 1 percent of the ADI for most pesticides and are below the ADI in all cases.

This failure of NRDC to consider raw and processed/cooked foods differently from the standpoint of levels of pesticide residues and the failure to use available data on what people really consume in the way of pesticide residues has probably resulted, by itself, in at least a 10 to 100 fold overestimate of the estimated risk.

Also, the NRDC did not attempt to determine how much processed food versus raw fruits and vegetables is consumed by children as opposed to adult women and as a consequence their risk comparisons in this regard are completely meaningless. Since the processing of foods markedly affects pesticide residue content, even small differences in proportions of processed versus raw foods consumed can have major effects on total dietary intake of residues.

It must also be noted that while NRDC emphasizes its use of "detected residue levels", in Table 13 NRDC uses tolerance limits for 8 pesticides, resulting in an additional very large overestimation of dietary intake. Also, there is an inconsistency between NRDC Tables 11 and 13. For example, in Table 13, it is claimed that preschoolers are exposed to 16,442 percent of the ADS (a number which for the above reasons is ludicrous) while in Table 11, exposure of preschoolers to diazinon from ingesting diazinon containing commodities is given as from 4 percent to 87 percent of the ADI and exposure from the total diet is given as from 7 percent to 206 percent of the ADI.

In particular regard to Alar (daminozide), Alar is now used only on some perhaps 5 percent of the apple crop. Data on samples of apples and processed apple products from the 1987 and 1988 growing seasons indicate that samples from infant food processors showed less than 3 percent of apples or apple juice concentrate with quantifiable Alar residues (i.e., less than 1 ppm), these samples were rejected for further processing. No samples of finished infant foods contained quantifiable Alar residues. Processors of adult foods found 1 sample of 2,449 analyzed to contain a barely quantifiable Alar residue (1.3 ppm). Even when Alar's use was more widespread (on some 40 percent of the apple crop) residues were generally low or nondetectable. FDA, in 1986, analyzed apples, applesauce, apple juice, and other products for daminozide and UDMH. None of the samples exceeded 1 ppm daminozide or 0.07 ppm UDMH.

Hazard potential of substances listed

We have briefly reviewed the data base on the pesticides discussed by NRDC. Some of the chemicals (notably acephate and parathion) cited by NRDC as carcinogens are not so considered by the scientific community at this time. For several of the chemicals cited as being mutagenic, the data do not support this claim. Also, there is no basis in the data to suggest that there is some new neurological hazard from chronic low level (below the ADS) exposure to pesticides, as NRDC suggests.

Risk assessment methodology

The methodology used by NRDC is completely invalid as it has been used. One can derive estimates of risk using a model like the NRDC model but not in the way

NRDC has done. To back calculate the constants in NRDC's model (which is structurally different from the EPA linearized multistage model) from EPA's q* values as NRDC has done is totally inappropriate*. The accepted way to determine constants in a specific model (as well as to determine if the model provides a good fit to the data at all) is to apply the model directly to dose-response data obtained in an animal bioassay (or for cases where there is human epidemiological data, by fitting to the human data). This, NRDC has not done. To do what NRDC has done provides a set of constants which may or may not be correct at the specific exposure level of 1 mg/Kg per day. It does not produce a set of constants which are appropriate for NRDC's model at lower exposures, particularly since NRDC's model is not linear with dose. In effect, NRDC has taken a unit risk factor (q*) from a linear model and used this to back calculate a constant in a nonlinear model.** This flaw is so fundamental as to completely invalidate NRDC's risk estimate numbers. That is, unless they are recalculated correctly, the numbers are useless and can in no way be compared to EPA's numbers. The error introduced by NRDC's back-engineering of the estimates is likely to be several orders of magnitude (an order of magnitude is a factor of ten).

The specific flaw discussed above does not, per se, affect the "relative risk" (Table A3-4 and A3-6) calculations made by NRDC for accrued risk at various portions of the lifetime. There are other problems in this area.

NRDC has taken a model which provides for a carcinogen to act on any or all of the stages of a "multistage" carcinogenic process and then assumed that all of the pesticides considered act only on the first few stages of this process. This assumption is the fundamental basis of NRDC's assertion that some 57 percent of lifetime risk accrues during the first 5 years of life. To assume that all of the pesticides considered are involved the early stages of a 4 or 5 stage process is inappropriate and unsupported by available data.

Available data in animals and humans show that chemicals may or may not behave in a way predicted by the NRDC model. The best human data available, which is smoking and lung cancer data, lead to a different conclusion: That only a small fraction of the total risk is incurred during the first few years of smoking. Data in animals, in studies specifically designed to be able to investigate the question of how much risk accrues during the first few years of exposure, also are inconsistent with NRDC's conclusion that some 57 percent of the total lifetime risk is accrued in the first 5 years of life. Even the same chemical may behave differently in the same species at different target organs. The carcinogen 2-acetylaminofluorene (2-AAF), in the mouse, produces only 0.6 percent of the total lifetime risk of bladder tumors over a portion of the mouse lifespan equivalent to 0–5 years in a human. In the same exposure window, 2-AAF produces only 35 percent of the lifetime risk of liver cancer in mice. Indeed, it has been theoretically calculated that there is only at most a 6 fold error made in considering a short term exposure early in life to a carcinogen which acts on only the first stage of a six stage carcinogenic process by assuming a lifetime averaging as opposed to considering just the effect during the short term exposure. The more stages on which a carcinogen acts, or the later the stages, the lower the error. Further, since cancer has a latency of usually anywhere from 20 to 40 years, NRDC's assessment predicts that human cancer should be a major problem in the age groups 25 to 45 (since aside from the possible carcinogenic effect of pesticides there are all the various factors operating from birth which eventually do cause cancer). This is clearly inconsistent with the observation in humans that it is not, cancer being primarily a disease of old age. While the equation used by NRDC can (as can other equations) model the age distribution of human cancer, this discrepancy between theoretical prediction and actual cancer incidence in humans raises serious questions as to the validity of NRDC's model for estimating accrued cancer risk as a function of age. Thus, NRDC's generic treatment of all agents as if they will produce 57 percent of the life-time risk within the first 5 years of exposure is unjustified and unsupportable. The citations which NRDC provides as studies which establish the time relationship of cancer risk do not generally, in any case, employ NRDC's model.

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* [q*, in EPA's model, is the lifetime risk to humans estimated for a lifetime exposure of 1 mg/Kg per day. Risk at lower exposures is calculated from q* and the human estimated dose in mg/Kg per day by a linear extrapolation.]

** For example, Peto et al (1984) report that the Weibul model shows a from 3rd to 6th power relationship on dose for nitrosoamine carcinogenesis in rats [in *N-Nitroso Compounds: Occurrence, Biological Effects, and Relevance to Human Cancer*, O'Neill, I.K., et al, eds., IARC, Lyon, France, pp. 627–665.

We should point out that there is nothing unique about the equation NRDC uses except how NRDC has used it. Also, the particular model used by NRDC is not the only model which take into account the age distribution of cancer risk. Among others is the time dependent multistage model, the Hartley-Sielkin model, and Sielkin's Gen-T model. The Weibul model (used by NRDC) is one of the more unstable models (with respect to low dose risk estimates) and is little used world wide. The Weibul model tends to predict lower risks at low dose than does EPA's linearized multi stage model.

An additional problem is that in using EPA's "q*" potency slopes to back-calculate NRDC's "C" constants (the slope term in the NRDC model), which values are based on scaling for different size bodies on the basis of "surface area"; NRDC has then calculated its relative dietary intake differences on a straight body height basis and then recomputed the equivalent intake per surface area for use in its model. This inconsistent methodology appears to lead in effect to a double adjustment for surface area. This may lead to an enormous additional overestimate of risk.

NRDC also ignores that the cancer biosassays relied on by EPA for risk assessment are conducted on animals placed on study as weanlings and exposed for most of their normal lifespan. Thus, the bioassay methodology already incorporates an automatic correction for any early age effects on lifetime cancer risks. No separate correction, as NRDC has attempted to do, is required.

NRDC has also, as long as time effects are being considered, ignored the Druckery effect. This is well established and is that the period of time required to develop cancer as a result of exposure to a chemical carcinogen (the latency) becomes longer as exposures are reduced. Usually, the latency is a function of the cube power of dose. Thus, at the exposure levels cited by NRDC the risks estimated, if they were real risks, would be expected to occur well after the end of the normal lifespan. For example, Peto et al (1984) have shown, as have others, that median onset time for nitrosoamine induced tumors in rats is a function of the square (2nd power) of the dose. Also, as have others, Peto et al (1984) found that with lower dose, tumors were projected to occur long after the end of the normal lifepsan. EPA's risk assessment methodology does not incorporate the Druckery effect and this is an additional conservancy (protection) built into EPA's methodology.

Also, it is not made clear in NRDC's report that the risk numbers presented are not actuarial estimates of potential future cancer incidence. These numbers are upper limits on what is essentially a relative risk number useful for regulatory comparison and decision making but from which no inference as to "cases" of human cancer may be drawn. It must be borne in mind that an upper limit risk number of 1 in 1 million, if taken as an actuarial risk, would have no impact on a person's risk of contracting even a cancer as rare as to occur spontaneously in 1 of 1,000 persons over a lifetime.

With specific regard to Alar, it must be pointed out that the q* value for UDMH used by NRDC to obtain the C value for use in NRDC's model is an out-of-date q* based on flawed studies which have been rejected as a sound basis for quantitative risk assessment. This reliance on an incorrect q* leads by itself to at least a 10-fold over estimate of the possible risk, to which must be added the effects of the various other errors in the NRDC methodology.

Table 1. Daily intake per unit of body weight (ng/kg body weight/day) of pesticides and industrial chemicals (1982–1984)[a]

Analyte	FAO/WHO ADI (ng/kg b.w./day)	Age/sex group							
		6–11 mo.	2 yr.	14–16 F	14–16 M	25–30 F	25–30 M	60–65 F	60–65 M
Acephate	500(T)+	0.3	1.1	0.8	1.6	2.5	2.6	2.2	1.7
Aldicarb	5000+[c]	0.4	0.7	0.2	0.2	0.2	0.2	0.3	0.4
Aldrin + dieldrin	100+	10.1	15.9	5.8	7.5	5.6	6.8	5.2	5.6
Aldrin	+	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	+	10.1	15.9	5.8	7.5	5.6	6.8	5.2	5.6
Azinphos-methyl	2500	6.9	22.2	4.8	5.0	4.6	3.3	6.2	5.1
BHC, alpha + beta + delta		7.2	16.5	6.3	7.5	4.7	6.3	3.5	3.9
BHC, alpha		7.2	16.1	6.1	7.3	4.5	5.9	3.3	3.7
BHC, beta		<0.1	0.3	0.2	0.2	0.2	0.4	0.2	0.2
BHC, delta		<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BHC, gamma (lindane)	10,000	1.9	7.9	3.1	3.4	2.0	2.5	1.6	1.8
Bromophos-ethyl	3000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Captan	100,000	36.1	62.9	19.4	15.6	20.8	12.1	42.5	39.0
Carbaryl	10,000	114.2	117.0	17.8	17.6	26.6	19.6	31.5	28.2
Carbofuran, total	10,000+	0.1	0.3	0.2	0.1	0.2	0.2	0.1	0.1
Carbofuran	+	<0.1	0.1	0.1	0.1	0.1	0.1	<0.1	<0.1
3-Hydroxycarbofuran	+	0.1	0.2	0.1	<0.1	0.1	0.1	0.1	0.1
Carbophenothion	500+	0.1	0.4	0.1	0.1	0.1	0.1	0.1	0.1
Chlordane, total	500+	5.1	6.5	2.0	2.5	2.4	2.4	2.6	2.7
Chlordane	+	2.4	2.0	0.6	0.5	1.1	0.8	1.5	1.4
Chlordane, cis	+	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chlordane, trans	+	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chlordene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nonachlor, trans		0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1
Octachlor epoxide		2.5	4.2	1.3	1.9	1.2	1.5	0.9	1.2
Chlorobenzilate	20,000	26.8	42.8	7.4	9.3	8.0	7.0	7.8	5.6
2-Chloroethyl caprate		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Chloroethyl laurate		0.2	0.4	0.3	0.5	0.2	0.4	0.2	0.3
2-Chloroethyl linoleate		268.2	633.4	265.3	417.3	177.4	320.4	141.2	201.5
2-Chloroethyl myristate		2.6	5.6	3.5	5.2	2.5	4.4	2.7	3.1
2-Chloroethyl palmitate		30.5	65.9	34.5	55.2	22.4	42.6	17.9	26.8
Chlorpropham		149.5	439.0	183.4	222.8	136.3	167.7	90.4	103.8
Chlorpyrifos	10,000	2.1	5.1	2.2	2.9	1.9	2.2	1.7	1.9
DCPA		1.9	2.4	0.9	1.2	1.2	1.1	1.8	1.8
DDT, total	20,000+	99.6	101.7	30.5	42.4	24.5	32.9	21.3	25.9
DDE, *o,p'*		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
DDE, *p,p'*	+	94.6	94.7	28.2	39.7	22.5	30.6	19.4	23.8
DDT, *o,p'*	+	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
DDT, *p,p'*	+	1.6	5.3	1.6	1.8	1.4	1.6	1.4	1.5
TDE, *p,p'*	+	3.3	1.5	0.6	0.8	0.5	0.6	0.4	0.5
DEF		<0.1	0.4	0.2	0.2	0.1	0.1	<0.1	<0.1
Diazinon	2000	12.1	27.0	9.7	12.9	8.5	8.8	7.3	8.3
2,4-Dichloro-6-nitrobenzenamine		2.5	3.1	1.0	0.6	0.9	0.7	1.6	1.3
Dicloran	30,000	256.0	268.1	87.7	51.5	80.0	60.0	135.1	115.6
Dicofol, total	25,000	15.6	30.7	5.0	5.9	5.4	4.2	8.3	7.2
Dicofol, *o,p'*	+	0.4	1.3	0.2	0.2	0.2	0.1	0.4	0.3
Dicofol, *p,p'*	+	15.2	29.4	4.8	5.7	5.2	4.1	7.9	6.9
Dimethoate, total	2000+	7.0	6.4	2.9	2.5	10.1	7.7	7.9	7.8
Dimethoate	+	5.2	4.0	1.1	1.3	5.7	4.4	3.3	3.8
Omethoate	+	1.8	2.4	1.8	1.2	4.4	3.3	4.6	4.0
Diphenyl 2-ethylhexyl phosphate		132.7	602.0	208.4	200.5	138.5	216.6	108.6	110.4
Disulfoton, total	2000+	2.2	4.8	2.3	1.8	2.4	2.2	2.9	3.0
Demeton-S	+	1.1	1.9	0.7	0.5	0.5	0.6	0.9	1.0
Demeton-S sulfone	+	0.1	0.9	0.9	0.7	1.3	1.0	1.1	1.0
Disulfoton	+	0.6	1.1	0.4	0.3	0.3	0.3	0.5	0.6
Disulfoton sulfone	+	0.4	0.9	0.3	0.3	0.3	0.3	0.4	0.4
Endosulfan, total	8000(T)+	35.8	35.3	10.4	12.2	11.8	9.6	15.1	13.1
Endosulfan I	+	5.8	7.1	2.1	2.7	2.4	1.9	3.2	2.8
Endosulfan II	+	15.3	16.5	4.0	5.0	4.4	3.4	5.7	4.9
Endosulfan sulfate	+	14.7	11.7	4.3	4.5	5.0	4.3	6.2	5.4
Endrin	200	0.1[c]	0.1	0.1	0.1	0.1	0.1	0.2	0.2
EPN		0.3	NC[c]	NC	NC	NC	NC	NC	NC
Ethion	6000(T)	6.4	11.5	2.2	2.7	2.5	2.0	3.1	2.2
Fenitrothion	3000	0.2	0.8	0.3	0.4	0.3	0.5	0.3	0.3
Fonofos		<0.1	0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor, total	500+	2.7	6.1	2.1	2.8	1.9	2.5	1.5	1.8
Heptachlor	+	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	+	2.7	6.1	2.1	2.8	1.9	2.5	1.5	1.8
Hexachlorobenzene		1.5	4.6	1.4	2.0	1.3	1.8	1.1	1.3
Isopropyl (3-chloro-4-methoxyphenyl) carbamate		0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1
Isopropylphenyl phenyl phosphates, mixed		0.1	0.7	0.4	0.2	0.4	0.4	0.8	0.5
Linuron		1.0	1.4	0.4	0.4	0.5	0.3	0.5	0.4
Malathion	20,000	142.3	232.8	74.8	107.1	61.8	72.9	53.9	62.9
Methamidophos	600	2.3	6.4	3.7	4.1	8.5	5.8	7.4	6.1

TABLE 1: (Continued)

Table 2 Continued

Analyte	FAO/WHO ADI[a] (mg/kg b.w./day)	Age-sex group[b]							
		6–11 mo.	2 yr.	14–16 F	14–16 M	25–30 F	25–30 M	60–65 F	60–65 M
Methidathion	5000	0.1	0.4	0.1	0.1	0.1	0.1	0.1	0.1
Methiocarb	1000 +	1.0	0.1	NC[c]	NC	NC	NC	NC	NC
Methomyl	10 000(T)	1.5	4.8	1.3	1.2	1.5	0.9	2.3	2.1
Methoxychlor, p,p'	100 000	1.7	6.3	1.5	2.1	1.2	1.4	1.1	1.2
Mevinphos, total	1500 +	7.1	12.1	3.9	2.9	4.4	2.4	9.1	8.3
Mevinphos, alpha	+	3.7	6.2	1.9	1.4	2.1	1.1	4.6	4.2
Mevinphos, beta	+	3.4	5.9	2.0	1.5	2.3	1.3	4.5	4.1
Oxamyl	30 000	0.1	0.2	0.1	0.1	0.2	0.2	0.3	0.2
Parathion	5000	11.2	5.0	1.5	1.2	1.4	1.1	2.0	1.8
Parathion-methyl	20 000	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PCBs (Aroclor 1221, 1242, and 1254)		0.6	1.2	0.4	0.5	0.5	0.6	0.4	0.5
Pentachlorophenol		59.0	48.5	16.2	20.7	15.9	18.2	13.9	15.5
Permethrin, total	50 000 +	1.2	5.6	3.3	3.0	5.0	4.1	6.5	5.4
Permethrin, cis	+	0.6	2.8	1.7	1.5	2.5	2.1	3.3	2.7
Permethrin, trans	+	0.6	2.8	1.6	1.5	2.5	2.0	3.2	2.7
Perthane		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phorate, total	200 +	< 0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1
Phorate sulfone	+	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phorate sulfoxide	+	< 0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Phosalone	6000	74.6	49.8	8.6	11.9	8.8	6.1	9.5	8.1
Phosmet	20 000	8.3	19.3	4.9	4.0	4.5	3.2	6.6	5.6
Phosphamidon	500	NC	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Quintozene, total	7000 +	2.3	8.7	1.9	3.3	1.7	2.3	1.7	1.8
Pentachloroaniline	+	1.3	4.0	1.0	1.5	0.9	1.1	0.9	1.0
Pentachlorobenzene		0.3	1.2	0.2	0.5	0.2	0.3	0.2	0.2
Pentachlorobenzonitrile		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenyl methyl ether		0.2	1.1	0.2	0.4	0.2	0.3	0.2	0.2
Pentachlorophenyl methyl sulfide	+	0.3	1.4	0.3	0.5	0.2	0.3	0.2	0.2
Quintozene	+	0.2	1.0	0.2	0.4	0.2	0.3	0.2	0.2
Ronnel		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sulfur		11.7	20.8	4.7	2.7	4.1	3.1	6.9	5.9
2,4,5-T	30 000	0.3	0.6	0.2	0.2	0.2	0.2	0.1	0.1
Tecnazene	10 000	6.7	17.8	6.8	7.0	6.3	7.1	6.1	6.7
2,3,5,6-Tetrachloroaniline		4.7	10.3	3.9	3.6	3.9	4.0	4.6	4.8
2,3,5,6-Tetrachloroanisidine		1.0	2.7	1.0	1.1	0.8	1.1	0.7	0.9
2,3,5,6-Tetrachloroanisole		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tetrachlorobenzenes		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tetrachloro-(methylthio) benzene		0.7	2.4	0.9	0.9	0.9	1.0	0.8	0.9
Toxaphene		6.5	20.5	6.1	8.3	5.8	6.8	6.9	7.1
Tri-(2-butoxyethyl) phosphate		2.9	14.4	8.4	7.7	12.9	10.7	16.8	13.7
Tributyl phosphate		38.9	27.7	3.5	5.0	3.3	2.7	5.4	6.2
1,2,3-Trichlorobenzene		0.2	0.3	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tri-(2-ethylhexyl) phosphate		27.2	71.0	24.9	31.7	24.0	28.2	23.2	26.4
Triphenyl phosphate		0.3	4.4	1.6	1.2	0.8	1.6	0.5	0.5
Vinclozolin	40 000(T)	7.8	13.1	4.1	3.1	4.4	2.4	9.4	8.5

[a] Total number of pesticide and industrial chemical residues found = 105 (excludes individually determined Aroclors).
[b] FAO/WHO ADIs are expressed in these terms for ease of comparison; ADIs are normally expressed in terms of mg/kg b.w./day.
[c] (T) denotes a "temporary" ADI.
[d] + denotes compounds for which the ADI includes other (related) chemicals.
[e] NC indicates that there is no consumption of a food item containing that particular residue in that age-sex group.

TABLE 1: (Continued)

Appendix C

Pesticide Intakes (µg/kg body wt/day) Found in Total Diet Analyses and Their ADIs for 3 Age/Sex Groups in 1987

Pesticide	FAO/WHO ADI[a]	Age/Sex Group 6-11 mo.	14-16 yr M[b]	60-65 yr F[b]
Acephate	3	0.0025	0.0031	0.0047
Aldoxycarb	5[c]	0.0002	0.0001	0.0002
BHC, alpha + beta	—[d]	0.0019	0.0017	0.0007
BHC, gamma (lindane)	10	0.0010	0.0018	0.0007
Captan	100	0.0194	0.0088	0.0244
Carbaryl	10	0.1550	0.0173	0.0227
Carbofuran, total	10[c]	0.0001	0.0001	0.0001
Chlordane, total	0.5[c]	0.0015	0.0018	0.0015
Chlorobenzilate	20	0.0090	0.0031	0.0026
Chlorothalonil	3(T)[e]	<0.0001	<0.0001	0.0001
Chlorpropham, total	—	0.1432	0.2072	0.1189
Chlorpyrifos	10	0.0207	0.0065	0.0040
Chlorpyrifos-methyl	10	0.0054	0.0066	0.0036
2, 4-D	300	<0.0001	<0.0001	0.0001
DCPA	—	0.0015	0.0011	0.0019
DDT, total	20[c]	0.0348	0.0191	0.0104
Diazinon	2	0.0146	0.0123	0.0066
Dicloran	30	0.2767	0.0682	0.1793
Dicofol, total	25	0.0329	0.0103	0.0101
Dieldrin	0.1[c]	0.0101	0.0045	0.0040
Dimethoate	10	0.0092	0.0009	0.0024
Endosulfan, total	8[c](T)	0.0724	0.0206	0.0400
Endrin	0.2	<0.0001	<0.0001	0.0001
Ethion	6(T)	0.0168	0.0063	0.0070
Fenitrothion	3	0.0004	0.0005	0.0005
Folpet	10(T)	0.0078	0.0029	0.0096
Fonofos	—	<0.0001	<0.0001	<0.0001
Gardona	—	0.0002	<0.0001	0.0001
Heptachlor, total	0.5[c]	0.0030	0.0018	0.0009
Hexachlorobenzene	—	0.0026	0.0018	0.0010
Iprodione	300	0.0064	0.0025	0.0038
Linuron	—	0.0010	0.0003	0.0004
Malathion	20	0.1395	0.1193	0.0710
Methamidophos	0.6	0.0092	0.0087	0.0215
Methiocarb	1[c]	—[f]	0.0004	0.0030
Methomyl	10(T)	0.0022	0.0029	0.0033
Methoxychlor, *p,p'*	100	0.0007	0.0005	0.0003
Mevinphos, total	1.5[c]	0.0126	0.0046	0.0139
Monocrotophos	0.6	<0.0001	<0.0001	<0.0001
Omethoate	0.3	0.0025	0.0011	0.0034
Parathion	5	0.0062	0.0007	0.0016
Parathion-methyl	20	0.0001	0.0001	<0.0001
Pentachlorophenol	—	0.0001	0.0002	0.0001
Permethrin, total	50[c]	0.0710	0.0300	0.0405
Perthane	—	0.0042	0.0016	0.0024
Phosalone	6	0.0808	0.0034	0.0040
Phosmet	20[c]	0.0078	0.0021	0.0049
Pirimiphos-methyl	10	0.0012	0.0016	0.0002
Quintozene, total	7[c]	0.0011	0.0011	0.0005
Sulfur	—	0.0025	0.0009	0.0031
Tecnazene	10	—[f]	<0.0001	<0.0001
Toxaphene	—	0.0101	0.0138	0.0099
Vinclozolin	40[c](T)	0.0121	0.0044	0.0145

[a] ADIs are usually expressed as mg/kg body wt/day but are expressed here as µg/kg body wt/day for ease of comparison. The ADIs cited here reflect revisions made in 1987.

[b] M=male, F=female.

[c] Includes other (related) chemicals.

[d] ADI not established.

[e] T="temporary" ADI.

[f] No consumption of a food item containing this residue in this age/sex group.

TABLE 2: TOTAL DIETARY INTAKE FOR PESTICIDES LISTED IN NRDC TABLE A2-1 IN COMPARISON TO EPA ESTABLISHED ADI's FOR CHILDREN OF TWO YEARS AGE

Pesticide	EPA ADI (ug/Kg)	Dietary Intake	Ratio of Intake to ADI (as %)
Acephate	0.3	0.0011	0.37%
Azinphos-methyl	1.3	0.022	1.7%
Chlorpyrifos	3.0	0.0051	0.17%
Demeton	5.0	0.0019	0.038%
Diazinon	0.09	0.027	30%
Dimethoate	20	0.0064	0.032%
Disulfoton	2.5	0.0048	0.19%
Malathion	20	0.23	1.2%
Methamidophos	0.05	0.0064	13%
Methyl parathion	0.25	0.0001	0.04%
Mevinophos	2.5	0.012	0.48%
Monocrotophos	0.05	<0.0001	<0.2%
Omethoate	0.3 **	0.0024	0.8%
Parathion	0.33	0.005	1.5%

Source: Gunderson, E.L. (1988) "FDA Total Diet Study, April 1982 - April 1984, Dietary Intakes of Pesticides, Selected Elements, and Other Chemicals", Journal of the Association of Official Analytical Chemists, Vol. 71(6): 1200 - 1209 (at Table 2)

Food and Drug Administration Pesticide Program (1988) "Residues in Foods - 1987", FDA, Washington, DC (at Appendix C).

** FAO/WHO ADI since EPA has not set an ADI

Senator ADAMS. Mr. Rice.

Mr. RICE. Thank you, Senator Adams. And thank you for the opportunity to testify today on an issue of concern to Americans across this Nation—the safety of our food supply, particularly in light of recent charges that the Government is not doing enough to ensure the safety of our children.

Let me say first the apple is safe—as safe and nutritious now as it ever was. The apple industry is acting responsibly to take Alar out of the food supply quickly, not because of any proven risk, but simply because of the uncertainties which have been mentioned here today.

I would also like to take this important opportunity to say, especially today, on behalf of the apple industry I want to thank and commend the U.S. Department of Agriculture, the Environmental Protection Agency, and the Food and Drug Administration for their forceful response to the crisis of confidence in apples around the country. Their efforts to reassure the American public and America's school systems about the safety of the food supply and apples in particular demonstrate a willingness to look at science and take affirmative steps to set the record straight.

I speak today as a parent, a seventh-generation apple grower from Adams County, Pennsylvania, and as chairman of the International Apple Institute, which represents apple growers and processors across the United States.

As you know, apples appear to have been singled out for attack in the current controversy. That should be reason enough for me to be here today. But our stake in this debate goes much deeper than economics. I speak for all apple growers when I say that no one is more concerned about the health of our children, America's children, than we are.

It is because of that concern, because we are committed to growing a safe and healthy product, and because we have a first-hand understanding of the products we use in our business, that I am testifying today.

You have heard already from the Natural Resources Defense Council, as has most of the American public via the news media. You have heard academy award-winning actress Meryl Streep relaying her concerns about her children's health and the effect she believes pesticide residues may have on them.

What has been missing in the story told by the NRDC and their well-orchestrated media publicity has been the voice of reason. Hysteria, not reason, is what we have today.

This hysteria has resulted in school districts withdrawing apples and apple products from their school lunch programs. It has resulted in parents pouring apple juice down their drains. It has resulted in children who have been terrorized by the specter of cancer because they have been eating apples or applesauce, or drinking apple juice for as long as they can remember.

This has occurred in spite of the fact that apples remain one of the best and most healthy foods that you can feed your family. They are packed with fiber, contain no fat or sodium, and they help lower cholesterol and blood pressure. That is why the National Academy of Sciences in their massive report on food and nutrition, and other leading medical groups say Americans should eat

more fruit like apples every day in order to decrease the incidence of cancer and other chronic illnesses.

Speaking as a parent of two young children, I say it is not only irresponsible, but it is unforgivable that the NRDC has been able to create this level of hysteria by the manipulation of the news media, the use of discredited data, and the demeaning of the scientific process itself.

By taking old studies which had been rejected by EPA's own Scientific Advisory Panel and by selective use of residue and consumption figures to suit its own ends, the NRDC calculated risk estimates that are far out of line with existing data, according to the EPA.

In its attack on apples and apple products, the NRDC claims that exposure to Alar and UDMH residues could possibly result in a cancer risk of one case in every 4,200 preschoolers exposed. That is an extremely alarming claim, but utterly void of scientific support outside of the NRDC.

Why, then, is that claim so widely believed in this country?

Alar is a material that has had very low usage in the apple industry. The Government's own figures show that less than 5 percent of last year's apple crop was sprayed with Alar, and that the usage curve for this chemical has been a steady downward line. This year, it will probably hit zero.

As an industry, we have been working to take Alar out of the food supply ever since the EPA first suggested that there might be a hazard connected to lifetime exposures. The International Apple Institute, representing all of the Nation's growers, has resolved that all growers should stop using Alar, a process which was begun voluntarily by the apple growers themselves more than 3 years ago.

On those apples that have come from trees sprayed with Alar, market basket testing results have never shown residue levels even approaching the 20 parts per million level the EPA has established as safe. In fact, most apples show no Alar residues at all, and those that do rarely have more than one part per million. No evidence to date suggests that Alar exposure in these levels poses significant risk to human health.

As a society, we seem to be susceptible to alarmist messages delivered by a famous personality or by skillfully-edited TV exposes. In this instance, not only have apples been unfairly branded as "bad for kids", but Americans' confidence in the ability and willingness of Government to ensure a safe food supply is under attack.

The apple growers in all 35 apple-producing States support serious research that will identify risks to children and adults from chemicals used in the food production process. We support the EPA review process, which is reassessing the continued use of a number of chemicals including Alar.

Most important, we urge the Congress to take the responsible actions necessary to restore Americans' confidence in their food supply and in the Federal Government's ability to ensure its safety. Decisions must be based upon sound science and realistic estimates of risk to public health.

In closing, we have every reason to believe today that apples are not only safe, they are good for everyone, especially children. We are saddened to see schoolchildren deprived of such a healthy snack due to unwarranted fears. We are shocked when we hear that mothers are afraid to give their infants apple juice, and we wonder about the less healthy alternatives that these children are now being given.

As an industry, we are proud of the reputation that we have earned over our long history, that "an apple a day keeps the doctor away"; and we look forward to maintaining that strong, positive, healthful reputation for apples and all apple products.

Thank you.

Senator ADAMS. Thank you, Mr. Rice.

[The prepared statement of Mr. Rice follows:]

PREPARED STATEMENT OF MR. RICE

Mr. Chairman. Thank you for the opportunity to testify today on an issue of concern to Americans across this Nation: The safety of our food supply, particularly in light of recent charges that the government is not doing enough to ensure the safety of our children.

I speak today as a parent, a seventh-generation apple grower from Adams County, Pennsylvania, and as chairman of the International Apple Institute, which represents apple growers and processors across the United States. As you know, apples appear to have been singled out for attack in the current controversy. That should be reason enough for me to be here today. But our stake in this debate goes much deeper than economics.

I speak for all apple growers when I say that no one is more concerned about the health of our children—America's children—than we are. It is because of that concern, because we are committed to growing a safe and healthy product and because we have a better, first-hand understanding of the products we use in our business, that I am testifying today.

You have heard already from the Natural Resources Defense Council (NRDC), as has most of the American public via the news media. You have heard academy-award-winning actress Meryl Streep relaying her concerns about her children's health and the effect she believes pesticide residues may have on them. What has been missing in the story told by the NRDC and their well-orchestrated media publicity has been the voice of reason.

That voice would say:

It is good to be concerned about ensuring the health of America's kids. But for that concern to turn into meaningful action, it must be based on a clear understanding of fact, and interpretation of science, not on fear and ignorance. Hysteria, no matter how well-intentioned, cannot result in a positive change. It cannot result in good public policy. And hysteria, Mr. Chairman, is what we have today.

This hysteria has resulted in school districts withdrawing apples and apple products from their school lunch programs. It has resulted in parents pouring apple juice down their drains. It has resulted in children who have been terrorized by the specter of cancer because they have been eating apples, or applesauce, and drinking apple juice, for as long as they can remember.

This has occurred in spite of the fact that apples remain one of the best, most healthy foods you can feed your family. They are packed with fiber, contain no fat or sodium and can help lower cholesterol and blood pressure. That's why the National Academy of Sciences and other leading medical groups say Americans should eat MORE fruit—like apples—every day in order to decrease the incidence of cancer and other chronic diseases.

Speaking as a parent of two young children, I say it is not only irresponsible, but it is unforgivable that the NRDC has been able to create this level of hysteria by artful manipulation of the news media, the use of discredited data, and the demeaning of the scientific process itself.

By taking old studies which had been rejected by EPA's own Scientific Advisory Panel and by selective use of residue data to suit its own ends, NRDC calculated risk estimates that are "far out of line with existing data," according to EPA.

In its attack on apples and apple products, NRDC claims that exposure to Alar residues could possibly result in a cancer risk of one case in every 4,200 preschoolers exposed. That is an extremely alarming claim, but utterly void of scientific support outside of the NRDC.

Alar is a material that has had very low usage in the apple industry. The government's own figures show that less than 5 percent of last year's apple crop was sprayed with Alar, and that the usage curve for this chemical has been a steady downward line. This year, it probably will hit zero.

As an industry, we are working to take Alar out of the food supply. The International Apple Institute, representing all of the Nation's growers, has resolved that all growers should stop using Alar, a process which was begun voluntarily 3 years ago.

On those apples that have come from trees sprayed with Alar, market basket testing results have never shown residue levels even approaching the 20 parts per million level the EPA has established as safe. In fact, most apples show no Alar residues at all, and those that do rarely have more than 1 part per million. Nothing suggests that Alar exposure in these levels poses significant risk to human health.

As a society we seem to be susceptible to alarmist messages delivered by a famous personality or skillfully edited TV exposes. In this instance, not only have apples been unfairly branded as "bad for kids," but Americans' confidence in the ability and willingness of government to ensure a safe food supply is under attack.

Mr. Chairman, what you and the other members of the committee must decide is whether good public policy decisions can be based on bad science, on bad information, and on bad logic, for that is what the NRDC report really is.

The apple growers in all 35 apple producing States support serious research that will identify risks to children and adults from chemicals used in the food production process. We support the EPA review process, which is reassessing the continued use of a number of chemicals including Alar.

Most important, we urge the Congress to take the responsible actions necessary to restore Americans' confidence in their food supply and in the Federal government's ability to ensure its safety. Decisions must be based on sound science and realistic estimates of risk to public health.

In closing, we maintain that apples are not only safe, they are good for everyone, especially children. We are proud of our long history of "An apple a day keeps the doctor away," and look forward to maintaining that strong, positive, healthful reputation for apples and apple products.

Senator ADAMS. Mr. Josephy.

Mr. JOSEPHY. Senator Adams, members of the committee, wherever you are, I hope you will appreciate it when I say that this is not only a short personal comment on the whole subject we are discussing, but that I am not taking sides in this sticky matter.

My name is Robert Josephy. I retired in 1985 after growing tree fruits and some other crops for 50 years on a farm of 140 acres in western Connecticut. Before I sold my farm, I had it restricted so that it can never be developed.

In addition to participating in many farm programs, I have been an active supporter of most of the environment organizations that function in my State. I am now a vice president of Housatonic Valley Association; I have been a member of the board of control of the Connecticut Agricultural Experiment Station at New Haven since 1962, and on various boards advising the Commissioner of Agriculture since 1957.

I am not a scientist. It seems to me that there are already too many people with limited scientific credentials, or none at all, who are expressing strong opinions about the very difficult pesticide question.

I am reminded of what an English philosopher said: "Exact knowledge is a great handicap to forcible statement."

I am testifying today because it seems to me that public debate about the use of chemicals in agriculture is getting out of control. Both as a farmer and as an environmentalist, I want to see public

health protected, but I also want to see us maintain our capacity for feeding ourselves and part of the rest of the world.

I am wondering whether our very limited success in dealing with other major problems, such as air and water pollution, global warming, population growth, is leading us to believe that there is an easy solution to at least one of these problems—to simply eliminate the use of all chemicals in agriculture.

To use an old phrase, we are perhaps in danger of throwing out the baby with the bath water.

Extravagant statement on this subject is not a new thing. In 1962, Rachel Carson did a useful service by pointing out the dangers of DDT; but in writing about other chemicals, she was selective in her choice of facts. This limited the value of her work.

I realize that this hearing is intended to focus on the use of Alar, but it seems to me impossible to separate the use of this chemical from the general practices of commercial apple growers.

As a farmer for 50 years, I was of course aware that new facts about toxic substances in the food chain were gradually coming to light. I would like to leave with you a 1986 issue of a technical bulletin from Cornell which is widely followed by growers. You will find in it recommendations for the safe use of pesticides and suggests the concerns that farmers have in this matter. Also, I am leaving a report on the tests of pesticide residues in produce made at the Agriculture Experiment Station in New Haven.

As to the use of Alar, I used it for many years. My usual practice was to spray it on half of my McIntosh trees every year. Up to 1984, the last year I managed my farm, no question had ever been raised about its safety. If I were operating that farm now, I think I would use it on some apples and post a notice saying that there were questions about whether they were safe to eat. I would also place on sale and mark apples that had not received Alar.

If and when the majority of serious scientists agree that Alar is dangerous, I would of course not use it at all.

Meanwhile, I have some suggestions. One is to educate the public to buy more Empire, Ida-Red, and other high-quality apples which have good red color, and if people really must have McIntosh, to buy them as they grow naturally.

My second suggestion is to listen to what serious and qualified scientists have to say and try to learn the real facts about risks to health.

My third is to give Bill Reilly, the new administrator of the Environmental Protection Agency, a chance. A lot of our confusion and impatience comes from the gutting of the EPA by the Reagan administration. People who know Reilly have confidence that he will really operate that agency in the public interest. Let us see.

Thank you for your attention.

Senator ADAMS. Thank you, Mr. Josephy.

[Additional material supplied for the record follows:]

Prepared Statement of The Uniroyal Chemical Company

During the above referenced hearing, Chairman Dodd and Senator Adams stipulated that additional information could be made part of the official records. Accordingly, Uniroyal Chemical Company desires to have the following comments added to the official record.

Position on Withdrawal of Alar from the Market

Uniroyal Chemical Company stands fully behind the safety of Alar. We recognize that the EPA is under significant pressure to demonstrate it is taking actions to protect the health of the American public. However, by targeting Alar it has chosen a product that independent laboratories and independent scientists have evaluated as posing no significant risk to public health. These independent laboratories have concluded that daminozide is not carcinogenic and that daminozide and its breakdown product, UDMH, are not mutagenic. Several lifetime carcinogenicity studies on UDMH are still being conducted; final results will be available early in 1990. In spite of the EPA's recent announcements to the contrary, it is unscientific and premature to base regulatory decision on interim data. No scientist can determine full relevance of these UDMH interim results until the tests are complete, particularly when the laboratory tests are conducted at feeding levels that are four million times greater than human exposure. In addition, the EPA is resurrecting old test data—that the Agency itself has declared unreliable in 1986—to support its current action.

The real problem before this Committee is not Alar. The American people have been misled by an unscientific and invalid study issued by the NRDC in February 1989. Taking Alar off the market will not restore public confidence in the quality of our Nation's food supply.

Our Nation and its regulatory process cannot function effectively on fear. The NRDC report has attempted to move the regulatory process from the scientific community to the media. Regulatory decisions must be based on good science using all available valid studies. To do otherwise would set a precedent of regulation based on media reaction to allegations rather than scientific peer review.

Our country does not have to wait three years for a final decision on Alar. The administrator of the EPA has the power and authority to present the issue to the Agency's independent Scientific Advisory Panel (SAP) at any time. We fully support accelerating the process and stand ready to present our case to the SAP at the earliest possible moment. Should these independent scientists conclude that the continued use of Alar presents an unreasonable risk to the health of consumers of any age, then Uniroyal Chemical Company will immediately withdraw the product from the market. Uniroyal Chemical is confident that this independent scientific peer group will re-affirm the safety of Alar.

Comparative Risk

We can find risk almost anywhere. To emphasize this point we are submitting a comparative risk graph which compares single daily exposure risk to common foods with UDMH. The UDMH data is a worst case scenario and is based on Uniroyal Chemical Company's 1986 market basket survey and the old, invalidated UDMH studies. This graph is based on Dr. Bruce Ames HERP Index. The UDMH data was added by Uniroyal Chemical Company.

Clearly, a daily exposure to common foods and beverages pose significantly greater health risk than UDMH. The American people need to understand the real facts about pesticide residues and their insignificant risk.

Uniroyal's Response to Comment that "EPA Would Not Register Alar Today"

We have heard the comment made that "EPA would not register Alar today." We believe this comment is misleading and incorrect for two reasons:

1. Alar was properly registered in 1968 in compliance with all of the health and safety testing requirements in effect at that time; and

2. EPA has not yet made a decision whether to "reregister" Alar: a complete scientific evaluation is yet to be performed. Uniroyal sincerely believes that when all the scientific evidence is evaluated, it will be found that Alar is a safe product—that it poses no health risk to children or adults. It will also be found that Alar is a critically important agricultural tool that provides great benefits to growers. Uniroyal is confident that when the jury comes in, it will be decided that Alar presents no health risks, that its benefits are plentiful, and that it will be reregistered.

Alar's Original Registration

Alar was first registered in 1968 under the scientific testing guidelines of the Food and Drug Administration and U.S. Department of Agriculture that were then in force. In 1968, the FDA required long-term feeding studies in two animal species—just like EPA requires today. Uniroyal performed a long-term feeding study with Alar in rats, and a long-term feeding study with Alar in dogs. Both of these studies were negative for cancer or other chronic effects. It is simply untrue and irresponsible for persons to allege that Alar was not properly tested for adverse health effects when it was first registered.

In 1984, EPA published in the *Federal Register* new chronic testing requirements for pesticides. 49 Fed. Reg. 42806 ("data requirements for pesticide registration". These new testing requirements reflected the many advances in the science of toxicology that had taken place since the 1960's. There is no question that the new testing requirements are much better than those that were in effect twenty years earlier. That does not mean, however, that the testing requirements that the government imposed on Alar in the 1960's were in any way incomplete or inadequate under the science of toxicology as it was then understood.

Alar's Reregistration

Uniroyal began new animal studies on Alar in 1984 on its own initiative. It did not wait for EPA to order new tests on Alar.

The new tests in rats and mice were conducted in accordance with EPA's newly published 1984 regulations, and were completed and submitted to EPA in 1988. They were conducted by International Research and Development Corporation. The laboratory reported that in both rats and mice, the tests showed that Alar was not associated with causing cancer in the laboratory animals.

Tests of Alar's potential to cause gene mutations and alter the DNA in cells also were completely negative. Taken together, this is rather strong evidence that Alar does not pose a cancer risk to humans.

EPA later requested Uniroyal also to conduct two additional feeding studies on UDMH. These studies were begun in 1986 and will be submitted to EPA in 1990. At the half way point in the study, the interim results show that UDMH does not appear to be carcinogenic in rats. In mice, it does not cause an increase in tumors at the four lower doses, but clearly does cause excess tumors at the highest dose tested. However, the tumors at this high dose are accompanied by signs of very severe toxicity in the animal's liver. It appears that it is the massive size of the dose itself—four million times higher than the amount of human exposure to UDMH—that is disrupting the animal's hormonal system and resulting in the production of tumors. The lower doses do not appear to cause liver damage, and there is no tumor production at the lower doses.

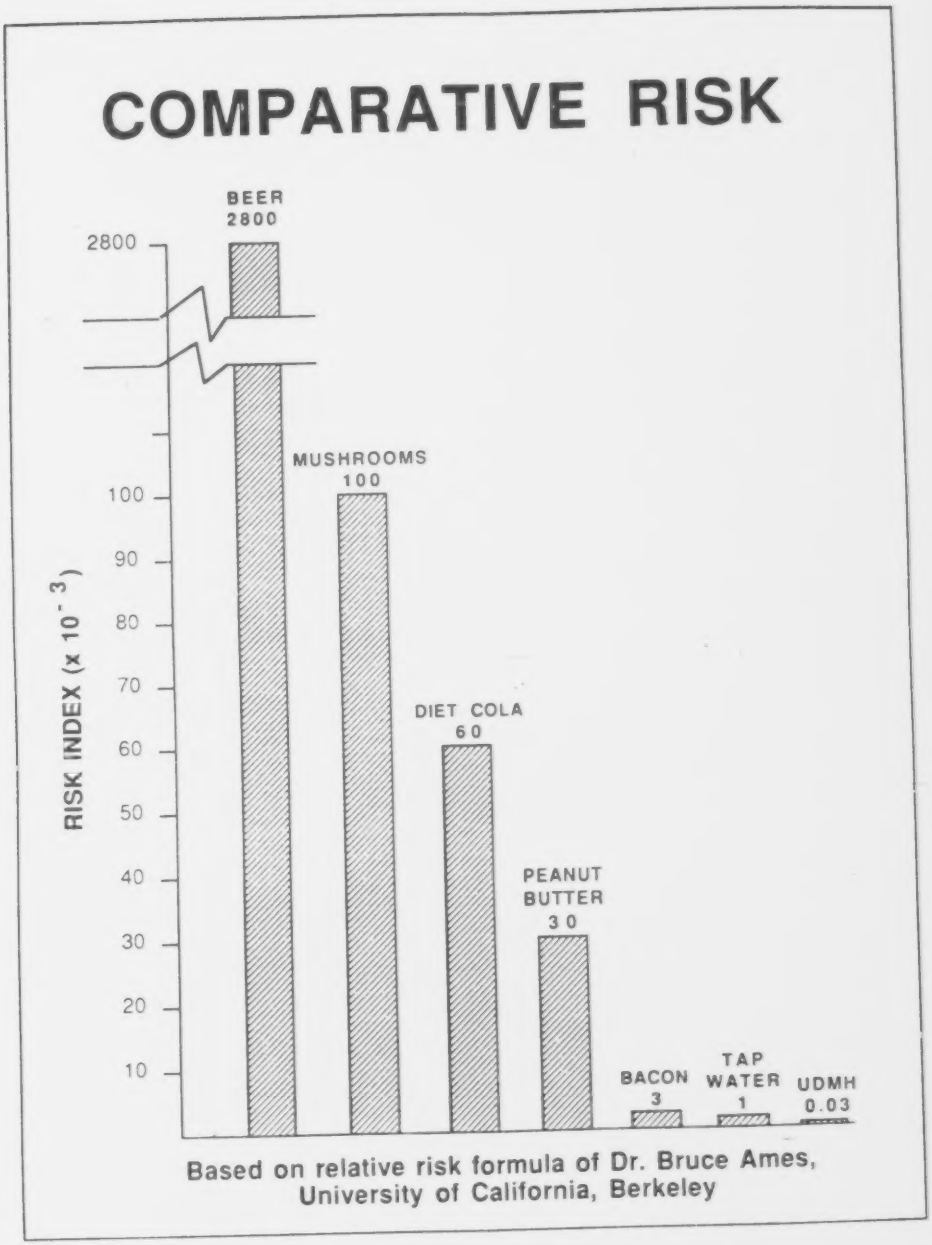
The point of all this is that there appears to be no health risk of cancer to humans from exposure to UDMH at very low doses. It is only when an extremely massive dose is force-fed to the animals, destroying their livers and hormonal systems, that tumors result.

EPA has not yet completed a comprehensive evaluation of this information. Indeed, the ongoing feeding studies have not yet been completed. We believe that based on the information currently available, Alar is completely safe to humans and will ultimately be reregistered by EPA as a safe product.

Response to Senator Harkins question to Dr. Moore on whether closed door meetings with EPA occurred.

During the period from 1978 through 1984 Uniroyal supplied EPA scientific data on daminozide use, benefits, exposure and analytical methodology. It was our understanding EPA had daminozide under review to determine whether to initiate an RPAR (Special Review). In addition to submitting scientific data that time period, Uniroyal Chemical Company submitted proposals to reduce daminozide risks through label changes, eliminating certain uses, reducing application rates or reducing tolerances. Uniroyal Chemical Company registration people met with EPA registration people in the normal course of business to review submitted data, to respond to EPA scientific questions and to discuss risk reduction proposals and to hear EPA request for additional data. These discussions were normal and a customary part of the regulatory process.

During this period Uniroyal Chemical Company held no meetings with EPA "behind closed doors" in which Uniroyal Chemical Company and EPA agreed to terminate or delay a Special Review of daminozide.


COMPARATIVE RISK
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DIET COLA
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PEANUT
BUTTER
30
30
20
10
BACON
3
TAP
WATER
1
UDMH
0.03
RISK INDEX (x 10 - 3)
Based on relative risk formula of Dr. Bruce Ames,
University of California, Berkeley

Letter from Green Mountain Orchards

Dear Mr. Wylie:

I am an 100,000 bushel-a-year apple grower from Vermont. As the Alar furor flared in 1986, I shut down my in-progress Alar application leaving two-thirds of my family's 300 acre apple orchard untreated.

Spurred by the fear of pre-harvest drop, harvest crew size and capabilities were increased. Two weeks into the normal 4-week MacIntosh harvest, a 2-day rain storm ended with 20,000 bushels of my biggest and best fruit on the ground. These apples, which I had hoped to sell for $15 or more per-case, were left to rot on the ground, their pick-up cost exceeding their value.

My father had been one of the first to use Alar in the Sixties and for 20 years Green Mountain Orchards has grown and harvested apples successfully with Alar. In one season for lack of one compound, I racked up staggering losses for the farm. The Alar talk died down, but the results of my decision were pounded home through the winter of grading and packing apples which exhibited poor color, stem punctures and bruising—all characteristics of Alar-free Macs. This cost money with each box packed and our total lost sales for the year easily exceeded $300,000.

After this disastrous year, I felt I owed it to my employees, my family, and now the FPCA to use Alar as long as it was available. In 1987 and 1988, I applied Alar to a significant portion of my crop and picked beautiful harvests of first quality fruit. In 1988, 25,000 more bushels were harvested than in 1986.

As a New England grower dedicated to the practice of Integrated Pest Management (IPM), I depend on Alar to help reduce my need for insecticides and miticides. An Alar-free tree drops its crop as it succumbs to leaf miner and red-mite pressure earlier in the season than an Alar tree. The drops then provide over-wintering sites for apple maggot, an insect that when originating from within the orchard, requires late summer insecticide sprays. Without Alar, I'll be denied the opportunity of producing healthier, more pesticide-free apples.

Now, I find myself with 25,000 bushels of first-quality, IPM grown Vermont Macs with Alar on them, and therefore of questionable marketability. It seems as though I cannot live without the compound and I cannot with it. I will gladly give up a compound that absolutely cannot be used, even under the most stringent restrictions, without significant damage to the environment or the public's good health. I support efforts to push down the tolerances of all compounds toward or below a negligible risk level, but let's not let the NRDC ban a compound whose use might, but does not necessarily, imply a significant dietary risk.

My question, Mr. Wylie, is how did I get myself in this mess? There are thousands of growers like me. I've been using a legal compound registered for use. My fruit residues are a minute fraction of the 20 ppm Federal tolerance, yet Janet Hathaway is accusing me of being a baby-killer. Perhaps it is the regulator's unwillingness to take on the larger question of all chemical residues in our food. I fear, through government inaction and a media-frenzy, it is the NRDC and not Congress that is running this country.

As I approach the growing season in Vermont where Governor Kunin has banned Alar use in 1989, I look forward with horror to the blankets of ankle-deep apples which will inevitably greet me some fall morning that should only be half-way through the fall harvest.

Please let me know your thoughts on where the scientific regulatory process is on this chemical issue.

Sincerely,

Evan H. Darrow

Prepared Statement of Larry C. Davenport, Executive Director of the Processed Apples Institute

Mr. Chairman and Members of the Committee:

The Processed Apples Institute is pleased to have this opportunity to comment on the issue of the risk to children's health from pesticides in the food supply. Our comments are limited to the current controversy with respect to Alar (chemical name: daminozide), inasmuch as our organization represents domestic and foreign processors of apple juice, applesauce and related products. Our members produce more than half of these products sold in the United States annually.

Apple processors are particularly concerned over the allegations made by the Natural Resources Defense Council (NRDC) to the effect that consumption of processed apples products represents an increased health risk to children over the course of a 70-year life span. In a March 7, 1989 release, Dr. John A. Moore, Acting Deputy Administrator of the U.S. Environmental Protection Agency (EPA), said:

"Since NRDC alleges that approximately 90 percent of the cancer risk to children from pesticides is attributed to the pesticide Alar and the ingredient product to which it breaks down, UDMH, EPA focused on NRDC's claim that the risk from UDMH is 100 times higher than agency estimates. The primary and greatest difference between EPA'S and NRDC's estimates arises from the fact that NRDC used cancer potency estimates from data on UDMH which were rejected in 1985 by an independent Scientific Advisory Panel. The Panel found these data inappropriate for generating risk estimates. (The Panel was established by Congress to provide scientific peer review of pesticide actions by the agency.)"

In its study titled "Intolerable Risk: Pesticides in Our Children's Food," the NRDC indicates that the data used to determine exposure were from the Phase III 1986 Uniroyal Market Basket Survey conducted for the EPA Office of Pesticides and Toxic Substances. These data (copy attached) show that, on average, the daminozide levels in apple juice and applesauce during the survey period were as follows: Adult apple juice .25 ppm, Adult applesauce .32 ppm, Baby apple juice .16 ppm, and Baby applesauce .44 ppm.

According to data aggregated by the apple processing industry, residues have decreased significantly since the data on which the risk estimates were based were compiled. The apple processing industry has reduced daminozide levels by carefully screening incoming fruit and rejecting lots having levels detectable using the officially approved FDA test method. Processors' vigilance, combined with the continuing decrease in the use of daminozide by growers, suggest that the NRDC's risk estimates may have been based on erroneous exposure data.

The State of Massachusetts has been collecting daminozide residues on processed apples products since 1985. A compilation of their data for processed apples products is enclosed as Appendix 8. It is worth noting that no detectable residues of daminozide were found in samples tested in 1987 or 1988 using a test method with a detection limit of 0.1 ppm. We believe that the Massachusetts data are representative of the U.S. as a whole, inasmuch as there is no difference between the products offered in Massachusetts and those marketed elsewhere in the United States. Moreover, the Massachusetts market is sufficiently large to attract products from virtually every major processor in the United States and several regional companies as well. Put another way, we believe the Massachusetts data represent the state of the art for the U.S. apple processing industry at the present time.

It is our conclusion that the NRDC study, while well intentioned, was based on faulty exposure and residue data and, as a consequence, the risk to children's health from the consumption of daminozide-containing apple products has been significantly overestimated.

At a March 2, 1989 press conference in Washington, DC, Dr. Richard J. Navel, chairman of the Food and Nutrition Board of the prestigious National Academy of Science, indicated that one would have to consume 2,000 apples a week to reach the risk level postulated in the NRDC study. And, testifying before a congressional committee on March 2, EPA's Dr. John A. Moore said:

"In my opinion, the basis for this level of concern is that the public has been misled by the authors (of the NRDC report). It's way out of proportion to reality. I reaffirm the Nation's food supply is safe and that includes apples."

We urge the Committee to join our industry and responsible scientists in helping to assure concerned parents that their children are not at risk from the consumption of processed apples products. We appreciate the Committee's interest in this issue and would be pleased to respond to further inquiries regarding our industry's continuing efforts to provide safe products.

Appendix A

TABLE I

Comparison of Daminozide Residues
in Market Basket Survey Samples

Product	Phase I N	Phase I Mean	Phase I S.D.	Phase II N	Phase II Mean	Phase II S.D.	Phase III N	Phase III Mean	Phase III S.D.
A Red Delicious	23	2.09	2.96	24	0.84	0.90	23	0.20	0.42
B Golden Delicious	24	1.02	1.56	22	1.01	1.18	22	0.05	0.09
C McIntosh	17	1.52	1.19	8	0.91	1.21	19	0.76	1.32
D Apples - Other	24	1.80	2.91	23	1.23	1.56	21	0.89	2.31
E Adult Apple Juice	24	0.47	0.33	24	0.39	0.30	22	0.25	0.35
F Adult Apple Sauce	24	0.31	0.35	23	0.51	0.50	23	0.22	0.47
G Cherry Filling	23	1.64	1.54	24	1.87	2.65	23	0.81	1.27
H Peanuts	24	0.56	0.89	24	0.90	0.75	23	1.16	0.79
I Peanut Butter	24	0.60	0.84	24	0.51	0.36	23	0.35	0.41
J Grape Juice	24	0.03	0.04	24	0.02	0.01	-	-	-
K Baby Apple Juice	15	0.58	0.87	12	0.68	0.75	13	0.16	0.24
L Baby Apple Sauce	15	0.36	0.62	12	0.68	0.85	13	0.44	0.64

Comparison of UDMH Residues
in Market Basket Survey Samples

Product	Phase I N	Phase I Mean	Phase I S.D.	Phase II N	Phase II Mean	Phase II S.D.	Phase III N	Phase III Mean	Phase III S.D.
A Red Delicious	23	2.09	4.60	23	1.78	2.32	24	1.10	1.43
B Golden Delicious	24	2.00	2.84	21	2.12	1.84	24	0.67	0.35
C McIntosh	16	2.13	2.98	8	1.69	1.44	20	1.55	1.64
D Apples - Other	24	4.54	5.46	21	2.24	2.63	22	1.39	2.01
E Adult Apple Juice	24	12.75	10.53	22	14.91	14.67	23	14.91	18.38
F Adult Apple Sauce	24	19.42	21.97	22	29.50	28.46	24	23.25	38.09
G Cherry Filling	23	149.35	121.11	23	105.96	130.24	24	69.63	118.26
H Peanuts	24	19.08	16.93	23	22.96	12.57	25	32.16	14.15
I Peanut Butter	24	8.21	5.88	23	12.22	9.69	25	11.56	9.76
J Grape Juice	24	2.04	0.26	23	1.00	0	1	1.0	-
K Baby Apple Juice	15	30.93	34.82	12	48.67	49.04	13	26.46	29.76
L Baby Apple Sauce	15	43.00	50.43	12	51.50	51.96	13	38.38	64.80

N = Sample Size
S.D. = Standard Dev.

Appendix B

MASSACHUSETTS ALAR DATA

Summary of analytical data for daminozide in processed apple products in tests conducted by Massachusetts State Laboratories (1985-1988)

Product	Samples Tested	Samples With Residue*	Samples With No Detectable Residue
Apple Juice	120	2 (1985 only)	118
Apple Sauce	73	8 (1985 only)	65
Baby Apple Juice	51	5 (1986 only)	46
Baby Apple Sauce	50	0	50
Total	294	15*	279**

*High = 1.5 ppm Low = 0.3 ppm

** No detectable residue of daminozide was found in any sample tested in 1987 and 1988

ESTIMATED DETECTION LIMIT = 0.1 ppm

Test methods used - GCMS (Conditt Method) and Pam II

Prepared Statement of New York State Senator L. Paul Kehoe

Good morning. I appreciate the opportunity to appear and provide testimony at this hearing. I believe that the outcome will decide whether or not New York State apple growers will remain competitive with growers from other states. In fact, I believe that the ability of New York farmers to continue to grow McIntosh apples may well depend upon the decision that comes out of these hearings. Since McIntosh is our single biggest fresh fruit variety and the one most closely identified with New York State, the loss of Alar and the resulting loss of our ability to grow McIntosh apples in New York State would severely damage our apple industry. if a farmer cannot grow a marketable crop on which he can make a profit, however small, he will be out of business sooner or later. if Alar is banned in New York, it will be "sooner" for many New York apple farmers.

First, let me review some key facts and statistics about the apple growing industry in New York State.

In 1985, the latest year for which we have complete statistics, the total New York State production of apples was just under 26 million bushels, third in the Nation behind Washington (49 million) and Michigan (26 million) bushels. California ranked a distant fourth with some 14 million bushels. Therefore, one can say that there are three major apple producing states in the Nation and that New York State is one of the them.

Wayne County is by far the most prolific producer of apples in the State yielding 9.35 million bushels in 1985. This constitutes over 36 percent of all the apples grown in New York. When combined with the other western countries of the State they accounted for 70 percent of the State's total production with 18 million bushels.

McIntosh is the western region's leading variety with 15 percent of the production. McIntosh is also the leading variety in the eastern counties accounting for 37 percent of that region's apple output. The McIntosh variety is 22 percent of the State's total apple production.

Therefore, it is not surprising that McIntosh is the apple variety most identified with New York State in both production and marketing.

With these facts in mind, now let us turn to the subject of Alar. Here I should tell you that I speak from personal experience as I operate a small apple farm in Wayne County and I grow McIntosh apples. I can speak first hand of the great loss that occurs when Alar is not used on McIntosh. The apples drop prematurely from the tree and do not get the red color that super market buyers demand. Therefore, the crop is not saleable for fresh fruit.

It is a fact that McIntosh apples need Alar more than any other variety of apple. This substance delays maturity and holds the apple on the tree for harvest.

As soon as I was notified of this hearing, I contacted Cornell University, New York State's Land Grant College and the No. 1 rated College of Agriculture in the Nation, for an estimate on the economic cost if Alar was banned in New York.

The average increase in preharvest drop is estimated at 25 to 30 percent of the total McIntosh crop. Since this fruit is not usable in the fresh market its value would be reduced by at least 50 percent for a total reduction in value of between $3.5 million to $4 million a year. This 50 percent drop in price reduces the growers return to less than the cost of producing the apple. Therefore, we are talking about a 100 percent drop in profit potential.

The lose of fruit condition due to lack of control over the rate of fruit maturation is manifested in poor fruit coloring, increased bruising damage during harvesting and handling and in loss of condition during storage and marketing. It is estimated that between 20-25 percent of the total McIntosh crop would be adversely affected in this manner at a cost of between $2.8 million and $3.5 million.

Without the use of Alar, it will be necessary to increase the number of apple pickers by at least 50 percent. Past experience indicates that this is not feasible for various reasons including lack of availability of local workers, limitations on importation of foreign workers, unavailability of adequate worker housing, limitations of supervisory help, inadequate harvest and handling materials and equipment, and limitations of refrigeration systems for adequately cooling fruit in existing storage facilities. As a practical matter harvest labor is very reluctant to do the multiple pickings that would be required to pick the same tree on several occasions as individual fruits "color". Pickers generally refuse to do this so called "spot picking" because it slows them down and reduces their income. Even when the farmer pays a higher rate for "spot picking", the pickers are still reluctant to do this slow tedious work.

Those are the annual short term costs of a ban on Alar. The long-term consequences are even more dramatic.

First among these will be the abandonment of older orchards consisting of large trees on standard root stocks that will not be economical to operate without the use of Alar. Sixty-two percent of all McIntosh orchards consist of this type of trees. Over 82 percent of these trees are over 22 years old, at or past their peak of production. The average statewide production of mature trees of this type, based on the 1985 survey data, is 417 bushels per acres.

Assumign that only 25 percent of these orchards are permanently removed from production the annual reduction in crop will approximate one million bushels of fruit with a value of $4.5 million. In practice, it would be more likely that over 50 percent of these orchards would be permanently removed from production in light of present costs of establishing and developing new orchards.

In addition to the consequences listed for McIntosh, reductions in value of fruit of other varieties will be encountered. Among these are: *Delicious.* Estimated loss of crop value due to water core and consequent loss of condition including flesh breakdown—$1.75 million per year. *Early-Ripening Varieties.* Estimated loss of crop value due to premature softening and loss of condition during marketing—$1.5 million per year. *Cortland.* Estimated loss of crop value due to loss of firmness and premature flesh breakdown—$0.5 to $0.75 million per year. *Stayman.* Discontinuation of production—$0.5 million per year.

There is no comparable alternative material for controlling preharvest drop of McIntosh. NAA (naphthaleneacetic acid) is the only other material currently registered for this purpose. NAA has a very limited period of effectiveness in preharvest drop control and does not provide the beneficial effects of delay of maturation and softening offered by the judicious use of Alar. At the present time there are no other alternatives known to be in the process of development.

Other information provided by Cornell Professor Wilkinson cautions us to "distinguish trivial risks for those of a more serious nature". We know that there is a serious disagreement among scientists about the affects of Alar on man. But even if Alar were banned from New York State apple production, it would do nothing to improve the health of New York residents, if in fact Alar constitutes a health hazard. That is because apples imported from other States which use Alar would not be banned. As a matter of fact, these imported apples would be much more attractive to consumers from both a price and appearance standpoint. The net effect of a ban on Alar only in New York State would be to destroy our State's apple industry without any substantial reduction in consumption of apples treated with Alar.

The whole idea of having the New York State Department of Health determine the use of Alar should be dropped. The Environmental Protection Agency is currently reviewing Alar. New York State should not make a premature judgment on the results of that review. That is particularly so when the results may be the loss of livelihood for many New York apple farmers. all producers across the country should live by the same set of rules. Unilateral action by New York State would do nothing to improve the health of our citizens and the cost would be disastrous for apple growers across the State.

National Agricultural
Chemicals Association
February 1989

TOUGH QUESTIONS AND FRANK ANSWERS

A Candid Approach to Food Safety

PREFACE

Food safety is an issue which touches us all. We have available to us an abundance and variety of food never equaled in the history of mankind...but is it safe?

The National Agricultural Chemicals Association (NACA) represents a responsible industry that recognizes consumer concerns about the safety of our food supply as it relates to crop protection chemicals. These concerns are legitimate and worthy of serious consideration.

In an effort to address these issues, NACA has compiled this document which consists of answers to the most commonly asked questions about the relationship of crop protection products to our food supply. The questions are tough and the answers are frank with no effort to dodge the issue where real concerns exist. The information contained in the answers comes from a variety of sources ranging from industry scientists to regulatory authorities at the federal and state level.

There are always more questions that can be asked and new information being developed that may, over time, change the answers to today's questions. The goal of this effort is to bring perspective to the discussion of food safety, allay some concerns and provide some basic answers to the question "Is our food safe?"

The first section clarifies some basic ideas, concerns and misconceptions about pesticide residues, addressing overall food safety, cosmetics, children's exposure, "organic" produce etc.

Part II discusses the grower's role in the production, and protection, of our food supply.

Part III lays to rest some myths and addresses the questions surrounding imported food products.

In Part IV the regulatory procedures that govern the agrichemical industry are detailed...procedures that insure that crop protection products are as safe as today's scientific knowledge will allow.

Part V addresses testing standards and procedures, both governmental and private, their purpose and place in the effort to assure the safety of our food supply through the application of sound science.

I. THE SAFEST POSSIBLE FOOD SUPPLY

1. HOW CAN WE BE SURE OUR FOOD SUPPLY IS SAFE?

The safety of our food supply is guaranteed in the first instance by the competence and integrity of all of those involved in bringing us the abundance and variety of foods that we enjoy.

Responsible growers using carefully researched crop protection products in an appropriate manner provide a "first line of defense." Processors and all the others in the supply chain, through careful handling to prevent contamination, make their contribution to the safety of our food supply.

Watching over this system are several government agencies charged by law with the responsibility for regulating every activity associated with food production. These agencies include the U.S. Food and Drug Administration (FDA) and the U.S. Environmental Protection Agency (EPA), augmented by additional responsible agencies of state government. Their role is to guarantee that the food we eat is safe through educational, regulatory and monitoring programs. They do their work thoroughly and with diligence.

The EPA's job is defined by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) which says that pesticide products may not be used until the EPA determines that their use will not pose an unreasonable adverse effect on man or the environment. In making this determination the EPA evaluates hundreds of studies relating to toxicology, metabolism, residues, environmental impact, and worker health and safety. Only after the Agency's scientists are satisfied that a product meets the criteria established under law will the EPA license, or register, its use.

It is the responsibility of the FDA to monitor our food supply (domestic as well as imported) to be certain that it meets the standards established to ensure safety. The FDA collects and analyzes about 15,000 food samples each year and has found that more than 98% of the samples tested meet the established standards. Of those that do not, the reason in most cases is an illegal use of a pesticide; the residue found was for a product not registered for use on that particular crop. It is important to note that while the use was illegal it does not necessarily mean that there is a health hazard involved.

In some cases, a misuse of a pesticide may have led to a residue above acceptable levels. This can occur if label directions are not strictly followed, too much of a pesticide is used or application is too close to harvest. Whether the case is misuse or illegal use the suspect food product is considered contaminated and is removed from the marketplace.

In addition to the assurances provided by federal programs, there are similarly rigorous enforcement, monitoring and inspection programs in the states. California has the most comprehensive of these and in 1987 its monitoring program found that more than 98% of the food sampled met the criteria for safety.

Dr. Sanford A. Miller, Dean of the Graduate School of Biomedical Sciences at the University of Texas Health Science Center, said in December of 1987, "Based upon my nine years experience as Director of the Center for Food Safety and Applied Nutrition at the FDA, as well as 20 previous years working at MIT in nutrition research and policy development, in my opinion, there is absolutely no evidence that the food supply is unsafe."

2. IN DEMANDING FLAWLESS PRODUCE (WHICH CANNOT BE GROWN WITHOUT PESTICIDES) AREN'T CONSUMERS SACRIFICING GOOD HEALTH FOR COSMETICS?

No. There is no sacrifice involved. U.S. consumers are among the most fortunate in the world in that they are able to select from a wide variety of fresh fruits and vegetables which are healthful, nutritious and attractive.

According to the U.S. Food and Drug Administration, the greatest risks to our health from the foods we eat are diseases caused by microorganisms, such as salmonella, and poor nutrition that can result from not eating a balanced diet. In the next lower tier of risk are environmental contaminants such as lead and mercury, and naturally occurring toxins, such as arsenic and aflatoxin. Very much lower on the list is the risk from pesticide residues.

The best and most reassuring advice about our diet comes from dieticians, physicians and scientists who are engaged in medical research. They strongly recommend a well-balanced and varied diet. And such a diet should include a variety of fruits and vegetables.

3. PESTICIDES ARE POISONS. HOW CAN EVEN TINY AMOUNTS OF PESTICIDE RESIDUES BE SAFE TO EAT?

That is an understandable concern. Common sense tells us that we do not want poisonous substances in our foods. Who would? But, what we forget when we make that judgement is that everything is poisonous and everything is safe...at some level.

There are lots of examples of this. Many substances at low levels are essential to our well-being but they can harm us or even be lethal if we get too much of them. For instance...

-- Our bodies can't function properly without a certain level of salt -- yet, we can hold enough salt in our two hands to kill us.
-- Lack of vitamin A causes night blindness, hair loss and skin disorders -- yet, too much is toxic and can cause birth defects.
-- Low levels of vitamin B-6 are essential to health -- but an excess causes numbness in the extremities.
-- Lack of selenium results in liver and pancreas damage-- yet, too much causes the "blind staggers," as seen in cattle eating loco weed. (Incidentally, the antidote for selenium poisoning is the injection of yet another poison, arsenic.)

In short, the concerns are understandable. But a balanced view of this issue will suggest that anything taken to excess can be harmful -- and that every compound known to man can be safe if the level is small enough.

4. YOU CLAIM THAT THERE ARE NATURAL CARCINOGENS IN FOOD. IF SO, WHY SHOULD WE ADD TO THE DANGER BY ALSO PUTTING MAN-MADE CHEMICALS IN FOOD?

We know that nature is not benign, that plants produce toxins which are often many times more hazardous to humans than man-made chemicals. We also know that we must utilize crop protection chemicals if we are to meet our needs for food. And we have discovered that pesticides may perform beneficial roles

in agriculture beyond increasing yields and giving consumers flawless produce. Fungicides, for example, inhibit the growth of aflatoxin, a mold which can appear on peanuts and other crops including corn. Aflatoxin is one of the most potent carcinogens and one of nature's own. The Food and Drug Administration routinely tests for unsafe levels of aflatoxin and will prohibit the sale of any products which exceed safe limits.

We know too that plants which are attacked by pests often increase the production of their own natural pesticides. The use of crop protection products can inhibit this process and thus contribute to the production of a more healthful crop.

Dr. Bruce Ames, chairman of the Biochemistry Department at the University of California at Berkeley, an expert in chemical carcinogenicity, has said

Specific quotation not yet cleared by Dr. Ames.

The evidence is there to support Dr. Ames. The American Cancer Society's published statistics on cancer rates show that cancers of the stomach, colon, bladder and kidney are holding steady or decreasing. If dietary intake were a significant cause of cancer, these rates should be increasing. In short, there is no "cancer epidemic" due to dietary factors.

The regulatory process is wisely designed to protect us from the excesses of nature as well as the mistakes of man. So, in spite of the presence of natural carcinogens and occasional residues of man-made chemicals in our food supply, our food is safe.

5. CAN I DO ANYTHING TO GET RID OF ANY RESIDUES REMAINING ON THE FOOD I BUY?

Recognizing that most of our food contains no detectable pesticide residue whatsoever, good hygiene still dictates that washing of fresh fruit and vegetables before eating should be a standard practice. In many cases washing may remove any pesticide residue that might remain on the produce surface. But, much more important is the fact that produce can carry a number of contaminants, such as insect waste, bacteria or other material which makes washing items before

consumption a matter of common sense. The primary reason for washing is sanitation.

6. AREN'T CHILDREN ESPECIALLY VULNERABLE TO PESTICIDE RESIDUES IN FRUITS AND VEGETABLES?

In recent monitoring studies by the California Department of Food and Agriculture, 80% of the produce tested showed no pesticide residues of any kind. In 19% of the samples, residues detected were well within established safety standards. In the remaining 1% where residues violated standards, levels were in a range which would not constitute a serious hazard.

Supporting the findings of the California program, the Federal Food and Drug Administration reports that "no residues were found in over half of the foods (domestic and imported) sampled in 1987, and less than 1% contained residues that exceed tolerances."

Even though federal and state monitoring programs show our food supply to be very safe, the system goes to even greater lengths to see that children are protected.

To augment the extensive health-related studies required prior to product registration, the EPA has developed very sophisticated computer programs to assess potential risk not only to the average consumer, but also to numerous sub-populations with specific consumption patterns, including infants and small children. Before a product is approved for registration, Agency scientists critically examine the potential impact that the presence of the pesticide might have on each of these sub-groups and, if the risk is acceptable, use will be allowed.

For example, infants consume large amounts of apples in the form of juice or sauce. Thus before approving the use of a pesticide on apples, scientists critically examine a variety of health related factors. These include the amount of the pesticide which is likely to remain on apples in juice or sauce under maximum use conditions, the amount of the pesticide that can be consumed safely over a lifetime, and the amount of other foods, treated with that pesticide, that infants are likely to eat. "Worst case" scenarios are examined and safety factors applied to assure that allowances exist for extreme circumstances.

As an added safety measure the FDA conducts a Total Diet Study as part of its monitoring program, designed to develop information on the total dietary pesticide intake. A special section of this program is devoted to children from six to eleven months of age examining typical infant diets and comparing pesticide residue levels, if found, to those levels determined to be safe. So, by the time our children drink their apple juice or eat their apple sauce or other foods, any possible effects on their health have been exhaustively studied and positive steps have been taken to assure their protection.

7. IS ORGANICALLY GROWN PRODUCE ANY SAFER?

Not really. The desire on the part of some consumers to avoid the trace levels of residues sometimes found on food treated with pesticides is entirely understandable. But it's a little bit like clutching the sides of your seat during the airplane takeoff. It may make you feel better, but it doesn't contribute much to your safety. Here's why:

-- Most produce from crops treated with pesticides doesn't contain any measurable residue anyway. Recent sampling by the California Department of Food and Agriculture found no residues on 80 percent of the produce tested. Less than one quarter of one percent of that produce had residues in excess of the extremely conservative tolerances set by the EPA to insure protection of the public health. Sampling by the Food and Drug Administration shows no residues in more than 50 percent of domestic and imported foods with less than one percent of the samples showing residues above established tolerances.

-- In addition, even organically grown produce carries a host of natural toxins. Plants generate these toxins to protect themselves against pests and disease. Dr. Bruce Ames, chairman of the Biochemistry Department of the University of California at Berkeley, estimates that our consumption of these natural pesticides amounts to 10,000 times our exposure to crop protection products. And there is some evidence,

says Dr. Ames, that plants grown organically, undergoing stress from insects and disease may even produce more of these natural toxins as nature tries to provide the protection that man has neglected to deliver.

-- Finally, the consumer has no guarantee that produce designated as organically grown was actually grown without pesticides. Nor does the consumer have any assurance, even if the produce has been analyzed, that pesticides are not present in smaller amounts than the test was able to detect.

In the final analysis, the best assurances we have of the safety of our food are the responsible practices of our growers and the continuous oversight of a regulatory system whose strength has already been proven. That regulatory system rests on the fundamental principle of toxicology that the dose makes the poison. Those who seek to negate or void that principle consistently find themselves in a tangle of logical contradictions, since nature is not benevolent and organic food is not "pure."

8. **ISN'T IT TRUE A LARGE PERCENT OF A PRODUCT'S INGREDIENTS ARE COMPOSED OF SO-CALLED "INERT" COMPOUNDS THAT HAVE NEVER BEEN TESTED?**

This is a valid point, but it's one that the EPA is already addressing. And it's simply not true that we have no information about inert ingredients at all.

Last year, the EPA announced a new policy for regulating inert ingredients, and the Agency is already taking action on those compounds it regards as the highest priorities. Based on the EPA's announced strategy, we expect that requests for data on inerts will be made in the near future and that the Agency will require upgrades to that data, just as they do now for active ingredients.

In the meantime, there is good cause to believe that the issue of inert ingredients does not merit the level of concern that some have suggested.

-- Many inert ingredients have been used for a long time in foods, cosmetics and pharmaceuticals. For those compounds,

considerable data already exist so that gathering the necessary information will be largely a matter of collation.

-- Because many short-term tests required by the EPA for acute toxicity and environmental studies are done on the end-use formulations, we have in hand a considerable amount of information which we can use to draw conclusions while longer-term studies are underway.

Put simply, more information is needed about inert ingredients in pesticides and the EPA is in the process of developing the program needed to ensure that information is gathered and critically assessed. In the meantime, we have considerable information about a number of inert ingredients used in pesticides, and the best information we have to date suggests that the practical level of risk they pose is either very low, insignificant, or nonexistent.

9. BUT DOESN'T THE NATIONAL ACADEMY OF SCIENCES REPORT PREDICT THAT 1.4 MILLION NEW CANCERS WILL BE CAUSED OVER A LIFETIME FROM PESTICIDE RESIDUES ON FOOD?

No, the National Academy of Sciences report <u>does not</u> predict that 1.4 million new cancers will be caused by pesticide residues. That figure is a misuse of data contained in the report and has been disclaimed by the Academy panel as being "meaningless." The figure was calculated from the report's data by an advocacy group seeking to advance its own ends, representing the figure as the conclusion of the report instead of its own.

Regrettably, this misuse of data went unquestioned by some reporters, and in a few cases, received more coverage than did the actual conclusions of the NAS report. The chairman of the NAS Committee, Dr. Ray Thornton, has stated flatly that the food supply is safe and that there is no need for Americans to change their eating habits based on the information contained in the report.

II. THE FARM COMMUNITY'S ROLE

10. SINCE PESTICIDES ARE SO DANGEROUS, WHY DO FARMERS USE THEM?

Our world is inhabited by an amazing variety of pests, most of which have voracious appetites. They include more than one million insect species, more than 1,000 species of harmful nematodes, hundreds of weed species and enough varieties of fungi to cause more than 1,500 plant diseases. If unchecked, these pests can quickly destroy an entire crop and, along with it, the farmer's hopes for his and his family's future.

In this battle for our food supply, farmers know that pesticides are vital tools. They know that, properly used, pesticides will enable them to grow higher quality produce, wheat, corn and other important crops and to grow them efficiently. Without the use of modern crop protection products our current agricultural abundance simply would not be possible.

Most growers are well trained in how and when to use pesticides and the agrichemical industry, the Agricultural Extension Service and other agencies are continually working to provide additional training to assure appropriate use. To farmers, pesticides are vital tools of production, as important as rain and good cultivation practices in getting their job done well -- the job of feeding us.

11. HOW CAN CONSUMERS BE SURE THAT FARMERS USE PESTICIDES PROPERLY AND LEGALLY?

The vast majority of farmers are honorable people who take seriously their role in protecting the environment and the health of their family and the public. Beyond that, however, there are strong economic forces which serve to ensure that growers do not misuse pesticides. To begin with, pesticides are expensive and over-use or other misuse of a crop protection product would add to the cost of production without a return on investment...something no grower can afford.

Moreover, pesticide use and application is stringently regulated by state and federal laws. Each pesticide product label is a legal document which states precisely the <u>amount</u> which can be applied, <u>when</u> in the life of the plant or target pest it can be applied, the <u>method</u> of application, the <u>crops</u> on which it can be used and the <u>pests</u> it can be used to control. Any deviation from label directions constitutes a

misuse and subjects the grower to substantial federal and state civil, and criminal, penalties. In addition, the grower's entire crop may be seized and destroyed.

The programs that monitor our food supply provide strong evidence that farmers do use pesticides properly and legally. Summing up the results of its 1987 food sampling program the FDA reported, "... less than one percent had residue levels that exceeded tolerances. These data illustrate that pesticide chemicals are rarely used in a manner that results in residue levels that exceed tolerances."

12. WHY DO WE NEED PESTICIDES TO MAINTAIN PRODUCTIVITY WHEN WE ALREADY HAVE A SURPLUS OF FOOD IN THIS COUNTRY?

There are a number of misconceptions built into this question that should be corrected.

-- First, most of the produce items found in the local supermarket are perishable and are <u>not</u> in surplus. Supermarket shelves could be emptied in a hurry given bad weather or a major pest infestation. Our nation actually has a surplus of just a few agricultural commodities, like corn and wheat, and these surpluses would last us only about half a year. So our food supply is not as inexhaustible as our full grocery shelves might lead us to believe.

-- Second, our nation's farmers compete in a worldwide market, and if we deny them the tools to produce food at a competitive price, someone else will produce that food and put our farmers out of business. Historically, America's food supply has been an important item in the balance of trade and has played a critical role in the maintenance of world peace.

-- Finally, drastically reducing the use of pesticides would not only impact the amount of food available, but it would also impact the quality and variety of our food supply. Without pesticides, some crops could not be produced at all, and others could be provided only in

small volumes at significantly higher prices.

Today, our nation's agriculture represents 20 percent of our gross national product and provides 17 million jobs, with two percent of our population providing food enough for our entire nation, including exports. Currently, one farmer in the U.S. feeds an average of 79 other people. Our farmers today grow 80 percent more per acre than their parents were able to produce. As a result of this efficiency, we pay considerably less for a wider variety of higher quality food than is offered anywhere else in the world. We are proud of that achievement.

III. IMPORTED PRODUCE

13. WHAT ABOUT IMPORTED PRODUCE? DOES ANYONE INSPECT THAT?

The Food and Drug Administration and state regulatory authorities have comprehensive inspection programs for imported produce. Imported foods must meet the standards required by the same provisions of the Food, Drug, and Cosmetic Act that govern foods produced in the United States. If standards are not met, a shipment can be refused entry, providing an expensive lesson for the exporting grower to use pesticides appropriately in the future. In cases where evidence of illegal residues are widespread, certification of compliance may be required from all shippers of a product from a particular country forcing an entire industry to upgrade its performance.

The most recent monitoring results from the FDA (1987 program) show that three and a half percent of imported foods sampled under their "surveillance" program were in violation of tolerances or contained illegal residues. According to the FDA, "These rates would probably be lower if the surveillance samples were collected in a completely random fashion...samples are chosen on the basis of volume of production of a commodity and also on the basis of prior residue problems with a particular food."

14. AREN'T U.S. CONSUMERS EATING IMPORTED PRODUCE THAT CONTAINS HARMFUL LEVELS OF PESTICIDES BANNED IN THE U.S.?

No, they are not. Just as federal and state government agencies control the quality of domestically grown food by inspecting and sampling it for pesticide residues, they test imported food too. If they find food contaminated by illegal residues -- residues of pesticides which have been declared unsafe or pesticides for which tolerances have not been established here -- then they will confiscate and destroy the shipment.

It is true that farmers in other countries may use pesticides that are not registered for use in the U.S. and these may even be manufactured by U.S. companies. There is nothing illegal or immoral about this. Farmers in many parts of the world have to contend with insect species, weeds and fungal diseases not found in this country. Thus, the products which are effective in controlling these pests may have no markets here.

Regulatory schemes for controlling the sale and use of pesticides exist all over the world, not just in the U.S. In fact, many countries have programs more stringent than our own. Other countries are working on improvements in their programs. Overlaying all of the individual country efforts, is an "umbrella" program under the auspices of the United Nations. This includes the work of the World Health Organization in establishing health standards and the Food and Agriculture Organization in evaluating residue data.

The regulation of the sale and use of pesticides is a worldwide endeavor and one in which governments and manufacturers alike cooperate to achieve the safest, most abundant and affordable food supply ever known.

IV. THE REGULATORY PROCESS

15. WHO DECIDES WHAT A "SAFE" LEVEL OF PESTICIDE RESIDUE IS, AND HOW DO THEY MAKE THAT DECISION?

The Environmental Protection Agency (EPA) makes that decision. Under federal law it is responsible for setting acceptable levels of pesticide residues on food. The EPA is very cautious in making these judgments. The levels set are extremely conservative and based on a number of worst case assumptions representing the Agency's judgment of amounts of residue a person can ingest throughout an entire lifetime without causing harm.

The procedures the EPA follows to arrive at acceptable residue levels are long, thorough and complex and the requirements placed upon the manufacturers are stringent. It typically takes about $30 million and from eight to ten years for a manufacturer to develop the information required to obtain the approvals needed to bring a new pesticide to market.

Let's assume that the EPA is setting acceptable residue levels for an imaginary "pesticide X" to be used on apples. The following are some of the considerations the EPA would use in assessing whether or not to register that pesticide:

-- First, the EPA would need to know the maximum amount of residue likely to be found on apples. To do this, the manufacturer would be required to test "pesticide X" at its maximum application rate for apples, with the maximum number of treatments and the minimum time between application and harvest using worst-case examples.

-- At the same time, the EPA would require the manufacturer to conduct toxicity tests so that it could estimate how much of "pesticide X" people could ingest on a daily basis without causing them harm. Based on these tests, the EPA would set an acceptable daily intake (ADI) level for the compound, applying, at a minimum, a 100-fold safety factor.

-- Based on statistical information, the EPA would then determine how many apples a person would typically eat in a year and how much of "pesticide X" they could

ingest from eating those apples. In assessing this, the Agency would make the assumption that every apple produced in this country had been treated with the pesticide and contained the maximum amount of residue.

-- The EPA would consider both the amount of human exposure to "pesticide X" from residue on apples and the exposures sustained from residues on other crops that might be treated with the same material. If the total exposure to chemical X stayed below the ADI, the EPA would grant a "tolerance" which would specify the residue levels of the chemical allowable on apples. If the total exposure predicted was above the Acceptable Daily Intake level, the EPA could impose special restrictions on use of "pesticide X" or deny the manufacturer's request for the new registration altogether.

-- After these steps are complete the EPA also considers the impact that the proposed use of "pesticide X" will have on what is termed the Theoretical Maximum Residue Contribution which represents the maximum amount of a pesticide residues which a human is apt to ingest in a typical diet.

-- In addition, if "pesticide X" is considered to be a potential carcinogen it will be subjected to extensive additional examination before a registration can be granted.

The efforts taken by government to ensure the safety of our food are very complex. They are based on extremely conservative assumptions and are intended to provide us with food we can be sure is safe -- a goal which the best evidence we have tells us they are achieving.

16. DO SCIENTISTS AND PUBLIC HEALTH OFFICIALS REALLY HAVE NO CONCERNS THAT THERE ARE LONG-TERM HEALTH EFFECTS TO FEAR FROM THE USE OF PESTICIDES?

It would be irresponsible not to be concerned. The strength of our regulatory system and the level of health research ongoing in this country are eloquent testimony to that concern. Our store of scientific knowledge grows daily and the actions taken to protect our food supply are constantly under re-evaluation and revision as new information is generated.

Our regulatory system requires a lot of testing before any pesticide is ever allowed to be used in this country. In fact, the development of a pesticide today typically takes about $30 million worth of research and from eight to ten years of work by the manufacturer merely to bring a new product to market.

The impact of that testing on food safety is evidenced by the general agreement of health experts that our food supply is safe. As an example, in 1987 the National Academy of Sciences (NAS) released a 270-page report on food safety which summarized the conclusions of two years of research. The NAS panel made a lot of recommendations about how to improve food safety. Its chairman, Dr. Ray Thornton, emphasized that the food supply is safe and that there is no need for Americans to change their eating habits based on the information contained in the report.

17. **IF THE EPA SUSPECTS A PRODUCT IS UNSAFE, SHOULDN'T IT BE BANNED IMMEDIATELY?**

This can happen. At any time the EPA believes that an imminent hazard exists from the continued use of a product, it may take swift action to get the product out of circulation. Occasionally, it has done so; for example, in the case of the fumigant, EDB. Unfortunately, such actions, the ban on EDB included, are rarely taken without controversy. Such moves require judgment calls and rarely represent full agreement within the scientific community.

One of the reasons that these decisions become controversial is that safety, another way of describing risk, is a relative term. A bathtub full of water may present no hazard to an adult but it might be a fatal trap for an unsupervised infant.

Also considered relative are the benefits which can be derived from various activities. One person may choose to jog five miles every day while others may prefer to get their exercise walking. Is one healthier than the other? This is a complex question. No less

so than the ones the EPA must grapple with in deciding which products can safely remain on the market.

The EPA, by law, must evaluate benefits as well as risks. This evaluation, if it is to be done properly, requires the input of those who benefit from the use of a pesticide as well as those at risk from its use. This is, and must be, a careful and deliberate process.

18. DOES THE AGRICHEMICAL INDUSTRY SUPPORT STRONGER REGULATIONS TO PROTECT CONSUMERS?

The industry supports increased funding for the pesticide enforcement programs of the EPA and the FDA. Regulations currently in place, if properly enforced, are sufficiently strong to ensure that consumers are protected and that our food supply is safe.

The agrichemical industry supported passage of the amendments to the Federal Insecticide, Fungicide, and Rodenticide Act which were passed by the Congress in October of 1988. These amendments will speed the process through which the EPA re-evaluates older crop protection products which were approved for use before the latest scientific techniques were available.

19. SHOULDN'T ALL PRODUCE BE LABELED TO IDENTIFY WHAT PESTICIDES HAVE BEEN USED ON IT?

Labeling every bit of produce in the supermarket -- every pear, cucumber, apple, strawberry, potato, peach, cauliflower, green bean, pea pod, carrot, mushroom, onion, and so on -- would be an enormous, and probably impossible, task and would provide no safety benefit. Regulating such an activity to ensure that all the labels were accurate would be an even greater challenge. In the final analysis, what would we gain from such an exercise?

State and federal agencies have been entrusted with the responsibility for setting and enforcing health-based standards to ensure the safety of our food. The best evidence we have suggests that these regulatory programs are working and working well. While a shopper's desires for that final bit of assurance may be understandable, our greatest safeguard is not found in labeling -- but in the integrity of our growers and in a well-functioning regulatory system which provides the American consumer with the safest food in the world.

20. SHOULDN'T ALL PESTICIDES THAT CAUSE CANCER BE BANNED?

Most of today's claims about cancer and pesticides are drawn from extreme exposures in laboratory animals. Dr. Bruce Ames puts it this way:

Specific quotation not yet cleared by Dr. Ames.

By law, the toxicological tests used to evaluate pesticides must be run at levels high enough to cause harmful effects in the test animals. But common sense tells us that these extreme animal exposures frequently have little to do with actual human experience.

While animal testing is an important gauge of the toxicity of a given compound, no one test gives an absolute answer. Rather, the significance of each test needs to be evaluated and a final decision made on the basis of a "weight of the evidence" approach. The EPA's carcinogenicity risk assessment guidelines, published in 1986, stress the importance of this approach.

Congress recognized the vital need for scientific judgment in the regulatory process by giving the EPA the discretion to make these evaluations through the risk/benefit provisions of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

Finally, it should be noted that there are no pesticides on the market today that are known to cause cancer in humans.

21. MANY FRUITS AND VEGETABLES COULD POTENTIALLY BE SPRAYED WITH A NUMBER OF DIFFERENT PESTICIDES. WHAT IS THE CUMULATIVE EFFECT OF THESE MULTIPLE RESIDUES ON OUR HEALTH?

The best evidence we have today is that there is no cumulative effect. There are good reasons why this would be the case.

The question of cumulative effect could be asked about lots of naturally occurring toxic substances in our food without considering pesticides. For instance, what is the cumulative toxicological significance of the solanine in potatoes, the hydrazines in mushrooms, the aflatoxin in peanuts and the ethyl carbamate in the yogurt one may consume in any given day? All of these natural compounds could potentially cause cancer. So how do we know we're safe?

There are several answers to this question that suggest strongly that no problem exists.

-- First, we must remember that the concentrations of chemicals we are concerned about are very low. This means that the amount of any single chemical, natural or man-made, in any food is so low that the amount of that food required to be consumed for the toxicity of the chemical to become a hazard generally goes far beyond the realm of reason.

-- The human body is a wonderful mechanism. Through metabolism, kidney and liver functions and excretion our bodies handle small amounts of many different chemicals simultaneously. This happens continuously and protects us against a wide range of chemicals from vitamins to table salt and other chemicals that can be damaging in large amounts.

-- Perhaps the best answer to this question lies in the actual health statistics for our nation over the past decade. We are living longer, healthier lives than ever before. With two major exceptions, cancer rates are either declining or holding steady. The two exceptions are skin cancer, which is commonly linked to sunbathing, and lung cancer, which has been attributed to smoking. The number of cancer cases that might be expected to reflect exposure to environmental chemicals -- stomach, colon, bladder and kidney cancers -- are not increasing. We are a nation of healthy people.

22. CURRENT GOVERNMENT REGULATIONS PROHIBIT CARCINOGENS FROM BEING ADDED TO PROCESSED FOODS LIKE APPLE SAUCE, SO WHY ARE RESIDUES ALLOWABLE ON FRESH FRUIT LIKE APPLES?

It should be emphasized at the outset that no pesticides are on the market that are known human carcinogens. However there is a discrepancy in the food safety laws that allows confusion on this important point.

The discrepancy in the regulatory system is the result of Congressional action taken when the understanding of carcinogenicity was quite rudimentary and analytical procedures were very much less sensitive than those of today. The "Delaney Clause" of the Food, Drug, and Cosmetic Act prohibits the establishment of any safe limit for a carcinogen (as determined by animal tests) added to processed food. This provision precludes the application of scientific judgment and, in effect, "freezes" science at the knowledge level of 1958.

Fresh produce is considered under a different law passed later, the Federal Insecticide, Fungicide, and Rodenticide Act, which allows safe limits to be established based upon the application of a benefit/ risk analysis.

A National Academy of Sciences panel has recently reviewed this issue extensively at the EPA's request. In general terms, the panel concluded that there is no good public policy reason for this discrepancy and that safe levels ought to be established for processed foods, too. We agree.

23. WHAT ABOUT DATA GAPS? AREN'T THERE PESTICIDES IN USE FOR WHICH THE DATA BASE IS INCOMPLETE?

The term "data gap" is misleading. It implies that there are little or no data about a particular product, and in the vast majority of cases this is simply not true. A better term would be "data upgrade," since the need for more information is generally created by new requirements based upon new scientific knowledge which is continually evolving.

Just as standards for automobile safety are constantly being upgraded, so are standards for developing pesticide data. Cars built after 1985 need to have an emergency stoplight in the back window, but

that doesn't mean that those built prior to that time are unsafe to drive.

In the same way, new means of testing products are constantly being required to develop pesticide data. But that doesn't mean that previous tests are invalid or that products developed before that time are unsafe.

Where the EPA has determined that a need to upgrade data exists, manufacturers are working to supply that information. If this is not done within a reasonable time, as defined by the Agency, the EPA has the authority to cancel the manufacturer's registration and pull the product off the market. This program was accelerated in 1988 and currently more than 200 of the 320 food use pesticides are under active review with data being upgraded for re-registration.

V. TESTING PROCEDURES

24. ISN'T IT TRUE THAT THE FOOD AND DRUG ADMINISTRATION INSPECTS LESS THAN ONE PERCENT OF OUR NATION'S FOOD SUPPLY? THIS SEEMS LIKE A MINIMAL LEVEL OF TESTING. HOW COULD IT POSSIBLY ENSURE SAFETY?

The real question here is, "How much produce do we need to sample in order to get an answer we can trust?" The validity of any sampling program lies in design of the sample and the ability for someone else to replicate the results as a cross-check. Food sampling programs are intentionally established with a bias which causes them to lean toward finding residues. As a matter of economics as well as common sense, foods are selected for sampling on a basis of volume, those most likely to have a residue, or where residue problems have surfaced in the past.

Food and Drug Administration monitoring of domestic and imported foods in 1987 showed only one and a half percent of domestic foods and 3.4 percent of imported foods carried residues in violation of standards. In their report the FDA stated, "These rates would probably be even lower if the surveillance samples were collected in a completely random fashion."

Results reported by the California Department of Food and Agriculture, which has worked very hard over the past few years to increase the volume of food it tests, adds validity to the FDA monitoring results.

In 1986, CDFA found 98.09 percent of the food it sampled to be in compliance with health-based standards. In 1987, after almost doubling the number of samples it took, CDFA found 98.52 percent in compliance. By doubling the scope of its testing, CDFA was able to document that its food supply was as safe, or more safe, than previously thought. These percentages track very closely with those obtained by the Federal Food and Drug Administration in their national monitoring program.

Let's also note that 80 percent of the food tested by CDFA contained no detectable pesticide residues at all, and 92 percent had less than 10 percent of the allowable amount. That hardly suggests that we're looking at a major problem.

But what about the two percent violation rate? Does it pose a hazard? The best evidence says "No." Safety factors have been built into the government's calculations to protect against this. In addition,

safe levels have been set, not based on one-time consumption of a single apple or plum, but on consumption of lots of apples, plums and other produce over an entire lifetime. Obviously, all food should be kept in compliance, but an occasional bit of produce that's slightly above tolerance is not going to do much to change the total picture and certainly doesn't represent an imminent hazard.

So, getting back to the question, "Is one percent sampling enough?" -- improvements could certainly be made in our government's food safety programs. But merely increasing the amount of produce sampled may only result in paying more money to get essentially the same answers.

25. WHAT CAN GOVERNMENT INSPECTORS DO WHEN THEY FIND ILLEGAL PESTICIDE RESIDUES ON PRODUCE? DOESN'T ANALYSIS TAKE TOO LONG TO PREVENT CONTAMINATED PRODUCE FROM REACHING THE SHELVES?

Government agencies have the authority to confiscate and destroy a crop containing illegal residues. They also have the power to impose civil fines for violations. This authority provides a powerful incentive for those applying pesticides to use them wisely and within the boundaries of the law.

As for the time it takes to get the sampling done, this varies with the lab and the urgency of the request. For the most part, routine surveillance samples are processed quickly. As an example, the supervisor of the Food and Drug Administration's San Francisco lab reports that over 90 percent of their routine samples are analyzed within one working day of being received and that the remaining samples are completed within five days.

Non-routine samples are treated somewhat differently, based on the needs of the situation. For instance, if produce from a particular grower or importer has previously shown violations, analysis will typically be stepped up on following shipments. If the produce has already been confiscated, a legal need will exist for further sampling by another lab in order to establish evidence -- and that takes a little longer.

26. BUT ISN'T IT TRUE THAT GOVERNMENT TESTING ONLY DETECTS ABOUT HALF THE PESTICIDES USED IN THE COUNTRY?

No. For the sake of economy, government programs use tests that can detect many chemicals in a single analysis. Some chemicals are harder to detect than others and need compound-specific tests, so they may be missed by the multi-residue tests.

Local offices of government food inspection programs inspect for these more difficult to detect compounds on a case-by-case basis. It would be neither practical nor cost-effective to test an apple or orange for every conceivable pesticide. Whether or not to run a specific test for a given compound is based on the local staff's knowledge of the use of that compound in their area. If local crops, pest infestations, and historical practices suggest a particular residue may be a concern, compound-specific analyses will be run.

This is intended as a reasonable, practical approach to food testing, and all available evidence suggests that it's working -- and working well.

27. HOW CAN AGRICULTURAL CHEMICAL MANUFACTURERS BE TRUSTED TO PERFORM THE SCIENTIFIC TESTING REQUIRED TO MEET REGULATORY REQUIREMENTS?

The testing which is done to demonstrate that a chemical can be used in an environmentally sound manner and without endangering public health is part of the process involved in developing a new product or defending the use of an older one. The generation of the data needed for making these determinations is appropriately the responsibility of the manufacturer.

The responsibility for determining the validity of the test data submitted by the manufacturer falls to the U.S. Environmental Protection Agency.

Several years ago, the EPA adopted "Good Laboratory Practices" regulations (GLPs) which enable it to identify fraudulent and improperly conducted studies. These regulations enable the Agency and registrants to determine that the lab and its staff are qualified to do the studies, that they are following approved protocols and are keeping all the required records.

Company laboratories are subject to inspection by government auditors; in most cases, once a year. These inspections check compliance with GLPs and ensure that tests are being conducted properly and that data collected is valid and complete.

Beyond all of this lies the economic reality that the cost of fraudulent reporting of data or faulty laboratory work would far exceed any possible profits derived from such acts. Careful, accurate, scientifically sound research is not only a requirement, it is good business.

As a final assurance, it is worth remembering that the scientists who do the testing and those who manufacture and sell pesticide products have families who eat the same foods as anyone else. They care about the quality and integrity of their work.

28. SHOULD SAFETY TESTS CONDUCT ADDITIONAL TESTING TO CERTIFY THE SAFETY OF THEIR FOOD?

Additional produce testing by supermarkets may prove to be an effective marketing gimmick, but its contribution to food safety is extremely limited and may in some instances prove counterproductive. Even in instances in which this additional testing is well motivated, the result can be undue concern and confusion.

As an example, in one recent case, a food chain in California turned down a shipment of corn it regarded as having illegal residues. The California Department of Food and Agriculture re-analyzed the produce and found no problem. As it turned out, the retailer had analyzed the corn with the husks on, because more people grill corn in the husk. But the CDFA had analyzed the corn with the husks off, based on the equally logical conclusion that no one they knew ate corn husks. A multimillion dollar lawsuit against the retailer is still pending from this affair, with the grower seeking compensation for lost reputation and the value of the lost crop.

The point is, we already have a strong regulatory system taking reasonable action to promote food safety and protect the public health. Sampling indicates that the regulatory system is working. In the face of that, additional testing in the private sector merely increases the cost of food -- without any real benefit to the consumer or contribution to food safety.

Prepared Statement of Ronald W. Wood, PH.D., on behalf of The American Psychological Association

I am Dr. Ronald W. Wood, research associate professor of Environmental Medicine at the New York University Medical Center. My statement is presented on behalf of the American Psychological Association's 90,000 members, including psychologists with interests in various aspects of normal and abnormal psychological functioning. I am a psychologist interested in the neurobehavioral toxicity of chemicals, especially those which are present in the workplace and in the environment.

I am also chairman of the APA Committee on Neurobehavioral Toxicity Test Standards of the Division of Psychopharmacology; this committee has been following with interest EPA's attempts to cope with the neurobehavioral toxicity of chemicals regulated under the Toxic Substances Control Act (TSCA), and, more recently, under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). We have been asked today to comment on the neurobehavioral consequences of dietary pesticide exposure of children, and on the current state of neurotoxicity testing for pesticides and other chemicals. In the process of doing so, we have examined the report of the Natural Resources Defense Council, "Intolerable Risk: Pesticides in our Children's Food", and some of the literature referred to therein. We share with NRDC a concern about the potential risks to public health of pesticide exposure, we appreciate their calling attention to this issue, and we support some of their findings and recommendations.

In this statement, I will:

Identify those portions of the NRDC report with which we are in strong agreement.

Discuss organophosphate exposure and its significance.

Challenge the adequacy of current procedures for setting Allowable Daily Intakes (ADIs) of food, which are used to set standards relative to pesticide ingestion, based on a no-observed-effect level (NOEL).

Offer a few remarks on the balancing of risks and benefits of pesticide use.

We have also attached an appendix which includes additional information for the committee's benefit.

Areas of Strong Agreement with the NRDC Report

". . . The problems posed by pesticides cannot be solved overnight. Effective Federal Government programs that protect humans and the environment are essential . . ." (p. 27)

". . . groundwater, the source of drinking water for half the Nation, can be a significant additional source of pesticide exposure . . ." (p. 96)

". . .the full extent of the neurotoxic risk from organophosphate exposure is unknown since the government does not require comprehensive testing for neurotoxic effects of these pesticides. Currently, the only mandatory test assesses solely the potential for causing specific delayed paralytic reaction following acute and subacute exposure. Nonetheless, studies suggest that low-level, chronic exposure to organophosphates can cause behavioral impairments and may alter neurological function . . . the full extent of the impact on preschooler health from exposure to pesticides in food is unknown since the majority of pesticides in current use have not been tested according to modern testing requirements . . ." (pp. 96–97)

". . . age-related susceptibility has been documented for a number of neurotoxins. . ." [many examples] (pp. 125–126)

". . . Sensitivity of the young results from physical immaturities in the nervous system such as incomplete blood brain barrier, nerve fiber coverings and receptor development . . ." [discussion] ". . . (these studies) do indicate that exposure to some organophosphates and carbamates early in neurological development may alter neurological function and may cause subtle and long lasting neurobehavioral impairments . . ." (pp. 127–133)

". . . The full extent of the preschool health impact from exposure to pesticides in food is unknown since data on the health effects of many pesticides are lacking . . ." (pp. 148–151)

EPA has systematically failed to consider the health and environmental effects of 'inert' ingredients in regulating pesticides . . ." (p. 160)

". . . EPA does not require any evaluation of effects of exposure on such processes as learning ability, activity level and memory, or on sight, hearing, emotion and other expressions of neurobehavioral activity. This is the case despite recommendations for comprehensive neurobehavioral testing of pesticides . . ." (pp. 160–162)

". . . EPA must require systematic testing of all pesticides for their potential to cause neurological damage . . ." (pp. 177-178) [We would permit exceptions only for those rare circumstances under which no human exposure can occur]

My support for the above findings of the NRDC report is based on a comprehensive review of the existing scientific literature on this subject as well as discussions with researchers in the public and private sector. The materials that have been provided at the end of my statement help to bring into perspective the striking paucity of test data on pesticides and other toxic substances. A 1984 National Academy of Sciences report entitled "Toxicity Testing: Strategies to Determine Needs and Priorities" highlighted the extent to which the toxicity of existing and new chemicals is unknown. The study found that only 34 percent of the pesticides reviewed have been tested adequately enough to conduct a partial assessment of their potential hazard to human health. Even more disturbing is that for 38 percent of pesticides and their inert ingredients no toxicity data at all are available. The NAS concluded that "It is clear that thousands or even tens of thousands of chemicals are legitimate candidates for toxicity testing related to a variety of health effects . . ." and that neurobehavioral toxicity evaluation is one of the highest priority toxicity testing needs. Little has changed in this regard since the release of this study in 1984.

The NRDC Estimate of Organophosphate Exposure and Its Significance

The NRDC report is based on a methodology for calculating the ingestion of pesticide residue and a diet survey that differs from that which is typically employed by EPA. The crux of their argument is that the EPA diet surveys do not reflect current eating patterns of children, and that exceeding the Allowable Daily Intake (ADI) as set by EPA represents a threat to health. EPA calculates an ADI by determining a no-observed-effect level (NOEL) from an animal study and applies a safety factor of 100 or more to that value; in the case of organophosphate pesticides, this is usually done on a measure of acetyichol inesterase (ACHE) inhibition, i.e. the impairment of the enzyme which breaks down acetyicholine (a neurotransmitter). Thus a safety factor is applied to a dose from which no detectable inhibition occurs.

Impairing the cholinesterase enzyme results in overstimulation of the nervous system that can result in adverse effects leading to death. Some chemical warfare agents work in this manner. However, the significance of low level cholinesterase inhibition is not completely understood. Many assume that 50 percent ACHE inhibition is required before overt functional effects occur; thus at lower levels of inhibition, percent inhibition might reasonably be thought of as an index of exposure rather than an index of functional impairment. Cholinesterase inhibition is poorly correlated with functional indices of neurotoxicity; there may be persistent inhibition of cholinesterase in the absence of obvious signs of impairment. Tolerance may develop to the obvious effects of cholinesterase inhibitors.

On the other hand, recent reports suggest that there may be learning impairment in animals otherwise fully tolerant to obvious signs of ACHE inhibition. We do not know the full consequences of chronic cholinesterase inhibition for the other systems of brain chemistry that may be indirectly affected by changes in cholinergic transmission. The consequences of chronic low level ACHE inhibition are not well understood at any age, but they are clearly of concern, and warrant further investigation.

Are Current ADIs Based on Appropriate Information?

In the case of organophosphate pesticides, cholinesterase inhibition does not predict the specific neuropathy produced by some of these pesticides; the agency has two testing methods to identify this potential injury. However, organophosphates are just one type of insecticide, and others produce no change in cholinesterase; yet the same regulatory procedures apply to the other pesticides regulated by this office, including fungicides and herbicides. At this time, there are no other required tests for neurotoxicity other than observing the test animals in their cages and a minimal examination of the nervous system for gross injury. Such observations may detect effects at very high levels of exposure, but they are, next to death, among the least sensitive techniques available for establishing a no-effect level.

The American Psychological Association, the Center for Science in the Public Interest, and other organizations concerned about the neurotoxicity of pesticides petitioned EPA seeking the adoption of more sensitive and appropriate testing methods. The agency has yet to require routine use of appropriate neurotoxicity testing methods, even though guidelines for such testing have been developed within the Office of Pesticides and Toxic Substances.

Despite the fact that many pesticides are designed to specifically attack the nervous system, in the absence of sensitive measurements of nervous system integrity, the ADIs are set on the basis of (no) observed effects on the otherwise most sensitive indicators of organ system damage, biochemical changes, changes in body weight, and so forth. The agency thus assumes that protecting against other kinds of injury will protect against neurobehavioral toxicity, undermining our trust in the current ADIs.

We recommend required testing of pesticides and their inert ingredients for neurobehavioral toxicity during the registration and reregistration process. EPA will need more staff with expertise in neurobehavioral toxicity evaluation to cope with this increased level of effort in the Office of Pesticides.

Since EPA has limited experience in establishing testing guidelines for neurotoxicity evaluation of pesticides other than organophosphates, surveillance of the health of workers involved in manufacturing, mixing and applying these chemicals should be improved. Workers deserve a safe workplace themselves, and they serve as important sentinels for the health of the rest of the Nation.

We further recommend that NIOSH and EPA be provided with resources adequate for expanding surveillance of worker populations for prevention of pesticide injuries, and for the identification of new or persistent disease states when they occur.

No testing scheme is perfect. It is very likely that some neurotoxic chemicals will evade detection. It becomes a certainty that this will occur if rodents are the only test species used, since they are insensitive to some types of sensory and motor injuries. In order to improve the efficiency of these early screening techniques, attempts should be made to identify the types of toxicity that will be missed by whatever testing procedures EPA eventually adopts.

We urge that when EPA selects tests for the routine neurotoxicity screening, these tests be routinely incorporated along with other more sophisticated and intensive testing techniques in the toxicity testing programs conducted under the auspices of the National Toxicology Program, or other governmental or industrial programs.

There should be an expansion of research programs to detect and characterize subtle or unrecognized forms of behavioral and neurological impairment produced by short-term and long-term exposure to representative pesticides throughout the lifespan of exposed populations. These programs should focus on impairment of sensation and perception, on disorders of cognition (e.g. learning and memory), emotional well-being, on motor skills and coordination, and changes in the structure and function of the nervous system. The intra- and extra-mural programs of EPA, FDA, NIEHS, and NIOSH should be expanded or refocused to accommodate these efforts.

Balancing the Benefits Against the Risks of Pesticides

The National Academy of Sciences has recommended that people eat 5 or more servings of fresh fruits and vegetables every day. The interests of public health are not served to the extent that people refrain from eating fruit and vegetables that offer a negligible risk of harm just because of fear, distrust, or an unwillingness or inability to pay the "organic farming" premium. The marketplace can provide some "organic", i.e. pesticide-free, produce, but at greater expense, with less availability, and with what may be a less appealing product.

Because exquisitely sensitive analytical techniques can detect a chemical in food does not in and of itself imply that the chemical represents a risk to health. With a few exceptions among non-cancer endpoints, most experts agree that levels of exposure to synthetic chemicals can be low enough to represent a negligible risk to health. In any circumstance, the decision to approve the presence of synthetic chemicals in our diet is a balancing act of benefit versus risk. A National Academy of Sciences report, *Toxicants Occurring Naturally in Foods* (1973), discussed this trade-off:

". . . In balancing the benefits against the risks associated with the consumption of food additives and pesticide residues, the considerations used differ in some respects from those involved in thinking about the benefits and risks associated with the natural chemical constituents of our foods. The essential justification for the use of an additive in food processing—or of a pesticide that leaves a toxic residue in foods—is some direct or indirect benefit to the food consumer. Furthermore, it is a basic principle that the risks judged to be potentially associated with the use of any such substance should diminish with the importance of the benefit it is designed to achieve. An increased nutritional value, an increased food supply, availability or keeping quality, or a substantially decreased cost to the consumer are benefits that

might be considered to justify a small degree of theoretical risk. An improvement in such superficial esthetic qualities of the food, however, as flavor, color, or consistency, that do not benefit the basic health or economic welfare of the consumer, are not acceptable bases for the use of a substance having a known or reasonably suspected risk . . ."

What we seek before this committee is a mandate to improve our knowledge of the hazards and risks attending the use of pesticide chemicals; in so doing you will help build and maintain our trust in those delegated to make these difficult decisions. The American Psychological Association shares with this committee a concern about the effects of chemicals on health and the environment, and we stand ready to assist you as you deal with these problems.

STATEMENT SUMMARY

Findings:

Children are especially vulnerable to a variety of toxic materials found in food and in the environment. This vulnerability is due to their achieving higher concentrations of chemicals in vulnerable organs, and to interference with normal processes during development.

Involuntary chronic exposure to chemicals that result in effects on behavior or the nervous system are of great concern, particularly with regard to insecticides designed to kill by adverse effects on the nervous system of the pest. Workers using pesticides bear the greatest risk of injury.

The hazards to the psychological and neurological development of children from ingesting pesticide residues on food or in drinking water are unknown. This results from grossly inadequate testing of pesticides for eurotoxicity. Those charged with protecting the Nation's food supply and drinking water must have the information necessary to do their job and to maintain public trust.

The National Academy of Sciences recommends that children and adults should eat a healthy diet including a wide variety of fruits and vegetables. In light of the public health benefits that accrue from an affordable healthy diet, the risk to health from consuming pesticide residues of food additives must be considered.

Recommendations:

Testing of pesticides and their inert ingredients for neurobehavioral toxicity should be required during the registration and reregistration process. EPA needs more staff with expertise in neurobehavioral toxicity evaluation in the Office of Pesticides.

Since EPA has limited experience in establishing testing guidelines for neurotoxicity evaluation of pesticides other than organophosphates, improved surveillance of the health of workers involved in manufacturing, mixing and applying these chemicals should be undertaken. Workers serve as a sentinel for the health of the rest of the Nation; NIOSH and other agencies should be provided with resources adequate for this task.

Attempts should be made to identify toxins that will be missed by those testing procedures that EPA eventually decides to adopt. Their selected tests should be incorporated in more intensive chemical toxicity testing programs conducted by EPA, the National Toxicology Program, and the regulated industry.

Expanded research programs should be undertaken to detect and characterize subtle or unrecognized forms of behavioral and neurological impairment produced by brief and long-term exposure to representative pesticides throughout the lifespan. These programs should focus on impairment of sensation and perception, on disorders of cognition (e.g. learning and memory), emotional well-being, and on motor skills and coordination. The intra- and extra-mural programs of EPA, FDA, NIEHS, and NIOSH should be expanded or refocused to accommodate these efforts.

PREPARED STATEMENT OF PAUL E. GREEN, PRESIDENT, DON G ORCHARDS, INC., PERU, NY

I thank you for this opportunity to submit testimony in support of the continued use of Alar under the Federal guidelines of 20 ppm. I am the president of Don G Orchards, Inc., a family owned commercial apple orchard in Peru, NY. My family has been associated with the apple business for over 50 years and I have been operating Don G. Orchards since 1970. We grow approximately 225,000 bushels in an "average" year and have grown as many as 241,000 bushels. About one-third of our total acreage is less than 8 years old. It is estimated that, by 1995, we will produce over 300,000 bushels. About 90 percent of our production is McIntosh. With the exception of 1986 when we had a very short crop of less than 150,000 bushels, it has

been our practice to use Alar on about 65 percent of our acreage (that which we cannot reasonably expect to pick in the first 2 weeks) in amounts not exceeding 3 pounds per acre.

In 1987, because of a potential marketing problem due to the publicity associated with Alar, we "hedged our bet" and used Alar on about 35 percent of our acreage. This turned out to be a grave mistake. Due to weather conditions over the summer, the fruit matured early and, shortly after Labor Day—10 days before we would normally start the main harvest, fruit that had not been treated with Alar started to drop from the trees. Within a week, the ground on most of the untreated blocks was covered with apples that had not even turned red yet. Liken it to driving down your street and finding your house consumed with fire! I would estimate that we lost approximately 50,000 bushels on the ground. Because of similar situations around the country, the price for processing apples was so low that we didn't even spend the money to salvage these apples. Based upon average revenue for apples this year, I would estimate that we lost almost a half a million dollars in gross receipts from the 1987 crop.

My testimony today will focus upon the potential impact of a ban on Alar upon the lives of the 35 or so folks who are supported totally by their employment at Don G Orchards, Inc. I will not address my personal situation and I will leave testimony on the scientific evidence to those much better qualified than I. I am sure my fellow growers will adequately address potential problems of shelf-life, storage ability and consistence of orderly marketing. I am here to tell you that, in short, a proposed ban on Alar would devastate the lives of a lot of hard working people of Spartan means who have worked here most of their lives and who have no reasonable alternative to work in the apple industry in Clinton County.

Assumptions:

I offer the following scenario if we are precluded from using Alar in 1988:

a. At this writing we have the potential for a "full crop"—let's conservatively say 220,000 bushels.

b. Without the use of Alar and in the absence of a viable substitute or twice as many Jamaicans to pick the crop, we would have not more than 3 weeks to finish the job that normally takes 6 to 7 seeks—7 days a week. (Note: In 1987, shortly after Labor Day—a week before our normal starting date—apples not treated with Alar began to fall and, within a few days, the ground was covered with apples that were still green).

c. We could expect to harvest about 50 percent of our potential crop, or about 110,000 bushels.

Consequences:

Wages at Don G Orchards are supported by a single source of revenue—the sale of apples. Without this revenue, expenses would need to be drastically curtailed. Many production expenses such as spraying and fertilization could not be eliminated as they would severely impact next year's crop. The only place to cut expenses to match the decreased revenue would be in wages and employee fringe benefits. Consider the following as you deliberate on whether or not to ban Alar or reduce the accepted residue level below 20 ppm:

a. In calendar year 1987 we paid a total of $317,323.96 in wages to about 37 local people. This does not include any apple pickers or family members. This included:

(1) About 20 apple packers.

(2) Four support people in the packing house.

(3) An average of 10 production workers.

(4) Three managers.

b. A great majority of these 37 people derive their entire family income from wages at Don G Orchards. They have no supplemental income and few have spouses with high-paying jobs.

c. With only half the apples to pack, obviously the first major impact would be with the 20 packers and the 4 support workers in the packing house. Either half of them would lose their positions or they all would work half-time.

d. With only half of the available revenue with which to pay wages, the next major cut would be with the managers. They, too, would be cut to half time as their positions could not be totally eliminated.

e. Productions workers would be cut as much as possible. While some must be retained to help grow the crop, there would be cuts that would drastically impact the quality of the fruit being grown. We would need to reduce certain functions such as mowing, pruning and some spraying. Within a very short period, this would seriously reduce the quality and quantity of the apples grown.

f. All non-statutory fringe benefits would be eliminated. These include Group Insurance (including Major Medical, Disability, Prescription Drugs and Life Insur-

ance), paid vacations and paid holidays. This, in itself, would almost eliminate our ability to attract and retain good employees.

Please trust me when I tell you that I have not been overly melodramatic in this evaluation. Since the Alar issue first "reared it's ugly head", we have given the matter a lot of thought and had a contingency plan ready. It is my considered opinion that, without Alar or a viable alternative chemical (which there are none), the apple industry in New York State, as we know it, is doomed. all the thought and contingency plans in the world will not keep any business afloat for very long that must try to support 100 percent of it's expenses with 50 percent revenue. There is not that kind of "margin" in this business.

I encourage New York State to adopt and support the residue levels of 20 ppm established on an interim basis by the Federal Government. This is not the time to play "hero" with the lives of hundreds, if not thousands of New York State workers who depend upon the apple business for their livelihood.

I call your attention to Addendum No. 1 of this testimony. At Don G Orchards, Inc. we export about 30 percent of our crop to Scotland and Ireland annually. During the 1987-88 marketing season this amounted to about 40,000 cartons of the three smaller sizes for a total gross sales of $440,349. All of our export apples are brokered by Tom Conaty, Ltd. of Belfast, Northern Ireland. Addendum No. 1 is testimony from Mr. Denis Connolly, a director of Tom Conaty, Ltd., that he asked me to enter into the record on their behalf. I poignantly illustrates the need for a uniform tolerance level of 20 ppm.

I thank you for your attention and the opportunity to submit our testimony and that of Tom Conaty, Ltd. Please remember, as your deliberate, that our apple crop can, even as we speak, be totally destroyed in an instant at the uncontrollable hand of Mother Nature. Must we endure a similar fate at the controlled hands of our own government officials?

Prepared Statement of John K. Baughn, General Manager, Don G Orchards, Inc., Peru, NY

My name is John K. Baughn and I am the general manager of Don G Orchards, Inc. in Peru, NY—a commercial apple growing operation producing approximately 225,000 bushels annually. About 90 percent of our crop is McIntosh. I have been associated with this business for over 10 years and, with the exception of a very small crop in 1986, we have selectively used Alar for all of that time.

My wife, Jane, is Office Manager at Don G Orchards, Inc. and I thank you for this opportunity to submit testimony on behalf of our family, focusing upon the devastating effect that a ban on Alar would have upon us all. I would first like to submit a scenario of what would happen if Don G Orchards was precluded from using Alar in 1988.

a. Without the use of Alar, the harvest season would be limited to not more than three weeks. It normally takes at least 6 weeks to pick the crop. It should be noted that, in 1987, there was very significant drop soon after Labor Day on blocks that had not been treated with Alar. We usually begin the main harvest about September 10. By that date last year, about one-third of the apples without Alar were on the ground.

b. If Alar were not used and, assuming a "normal crop" of 220,000 bushels, I would estimate that we would be lucky to pick 110,000 bushels from the trees—a reduction of over 100,000 bushels or 50 percent of a normal crop.

c. At Don G Orchards there is only one source of income from which to pay wages—the sale of apples. It is logical to assume that, if that income was not available, wages and/or hours would need to be cut by at least 40 percent as other production costs, such as spraying and fertilization, would need to continue. This has been confirmed by my boss, Paul Green.

d. Getting supplemental harvest help to complete the harvest before drop occurred is not a practical solution because of (1) insufficient labor camp space, (2) unlikelihood of approval from the Labor Department, and (3) the apples would not have sufficient color to be harvested at one time.

In calendar year 1987 my wife and I had combined wages of approximately $47,000—all from Don G Orchards, Inc. If we had to be reduce to 50 percent in hours and/or wages, our combined gross wages would be about $23,500 on which to support a family of seven. Three of our children are teenagers with two of them college-bound within the next 3 years. In your deliberations, please put yourselves in our shoes and consider the following logical consequences of action to ban Alar:

a. Higher education for our children at anything more than the local community college would not be possible. They are excellent students at Peru Central School and could easily succeed at more competitive (and expensive) colleges.

b. We would be reduced to a single vehicle which means that the younger children would be getting themselves off to school alone in the morning as my wife would have to ride to work with me and hang around for an hour until her work day starts. With four drivers and a single vehicle, the two children that work part-time to supplement future college expenses would have to quit work for lack of transportation.

c. While certain medical coverage is now provided for all eligible employees by the corporation, these non-mandatory employee benefits would need to be terminated. We would have no resources with which to pick up these expenses, in addition to the dental/optical expenses which we now bear. Two of our children now wear braces and two more will shortly need them. 20/20 eyesight does not run in our family. Four of us wear corrective lenses and it is likely that the other three will eventually need them.

d. What about any "retirement?" We now are able to squeeze out $2,000 per year for an IRA—our only source of retirement benefits as the company has no retirement plan. Social Security benefits, supported directly by gross income, would be diminished.

e. Occupancy expenses, such as rent and utilities, eat up about $10,000 per year with an additional $8,000 for food. You can see that, if you take $18,000 out of a projected gross income of $23,500 there is not a lot left.

We, like all good parents, are concerned about what we and our children eat. You may be interested to know that our children have consumed a lot of apples over the years that have been treated with Alar and they are all very healthy and happy. Consider the consequences to our family and the families of the other 35 employees at Don G Orchards as you consider banning Alar. In the absence of any scientific evidence identifying Alar as a significant health risk to humans, I would suggest that your potential ban on Alar would carry with it a "risk" to over 100 lives supported by its use at Don G Orchards which is far greater than the remote chance that it causes tumors in mice or rats. While banning the use of Alar in New York State might make you a "hero" in the eyes of a few, it will devastate the lives of so many in the State, like ourselves, that depend upon the apple business for our survival.

Thank you, again, for this opportunity to submit testimony in support of the continued use of Alar under the Federal guidelines of 20 ppm.

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March 15, 1989

The Honorable Senator Christopher J. Dodd
Chairman, Subcommittee Children, Family, Drugs and Alcoholism
Committee on Labor and Human Resources
The Capitol
Washington, D.C. 20510
FAX: 202-224-5431

Dear Senator Dodd:

I am honored to be asked to comment to the Committee as regards an important matter of child and adult health, health maintenance, and disease prevention. I am providing information on the methods through which we ensure safety of foods, food products, and food contaminants like pesticides. I will briefly comment on key knowledge now available through research on the real causes of major human cancers and other chronic diseases.

My attached CV will show that I am a retired Public Health Service Officer, with service at the National Cancer Institute from 1949 to 1972. In relation to the current problem of food contaminants, I was Head, Section of Carcinogen Screening, later renamed Director, Bioassay Segment from 1961 to 1972. With my associates, we performed research on optimal methods of testing environmental products for potential cancer-causing ability, and we actually carried out such tests. We developed the concept that such tests needed to be performed utilizing high dose levels in rats and mice. These rodents are exposed to the test chemicals beginning at weaning and extending for a life-span. Thus, they are designed to provide information on possible adverse effects, including the youngest to the oldest age groups. Because of this approach, the results obtained need to be interpreted carefully, together with collateral data, including mutagenicity, i.e. the ability to alter specific genes. Indeed, certain chemicals displayed specific weak effects that in the context of the aim of the program, namely, to define human cancer risks, needed such a critical evaluation. Documented human carcinogens cause cancer in 100 percent of animals, often in less than one year. For example, the mold toxin aflatoxin B1 that occurs in corn or peanuts (see Wall Street Journal, February 23, 1989) is a potent carcinogen in rats at 50 parts per billion (ppb). Tests for effects on the gene show it to be strongly positive. Such corn fed to dairy cows gives milk contaminated with this carcinogen and an active product. In all species, including monkeys, aflatoxin B1 causes liver cancer. Yet, liver cancer is infrequent in the USA, so that the action level of 20 ppb set by the FDA is a reasonably safe level. I have published many (over 400) scientific papers and review articles in this field.

As part of this effort, we tested Daminozide or Alar (NCI Technical Report No. 83, 1978). My interpretation of this test was that while male mice displayed slightly higher incidences of liver tumors when the test compound was administered at 5000 or 10,000 ppm, the remainder of the data did not reveal any real indication of carcinogenicity. Liver tumors in male mice, especially when obtained at a relatively low yield (18-30%) of such tumors with a test compound given for the lifespan of the animals at very high dose levels, cannot be construed to be evidence of human cancer risk. Furthermore, more recent research has demonstrated that this chemical is not mutagenic in the well-known Ames test, nor does it display other evidence of what technically is called evidence of possible effect on the gene. The Metabolic product UDMH (chemical name 1,1-Dimethylhydrazine) does likewise not seem to be genotoxic, and its carcinogenic effect in animals cannot be interpreted as providing a sound basis for ascribing any effect of Daminozide to this metabolite. These and other results indicate to me that trace amounts of this pesticide found on apples and other fruits and vegetables do not constitute any risk of cancer for humans at any age, including childhood.

On the contrary, research on causes of important types of human chronic diseases, namely, heart disease and nutritionally-linked cancers, like cancer of the colon, breast, pancreas, ovary, endometrium and prostate, are closely linked to the typical American diet that contains too much total fat and too little fiber, among other nutrients. Therefore, the interest of good health for the entire lifespan, from childhood to adulthood, and to the older ages, has led to recommendations to reduce fat intake and replace fatty foods by eating more vegetables and fruits. Therefore, clearly the recent alarm about unsafe fruits is totally in disagreement with recommended good health practices by entities like the American Heart Association, the American Cancer Society, the American Diabetes Association, and, of course, those of us who have performed research in the area of nutrition and nutritional prevention of chronic diseases. Eat less fat, less salt, more vegetables, fruits, fiber and low-fat or skim dairy products, and thus, significantly reduce the risk of formation of major forms of killing and disabling diseases--cancer, heart disease, and stroke.

I look forward to working with you, Senator Dodd, and your distinguished Committee to provide recommendations and a sound basis for maintaining, and, indeed, improving the health of the American people.

Sincerely,

JOHN H. WEISBURGER, PhD, MD
Senior Member and Director Emeritus

BRIEF BIOGRAPHY

JOHN H. WEISBURGER, PhD, MD (hc)

Since July 1987, Dr. Weisburger continues in research at the American Health Foundation as Senior Member. He was previously Vice President for Research of the American Health Foundation and Director of the Naylor Dana Institute for Disease Prevention in Valhalla, New York. He is also Research Professor of Pathology at New York Medical College, Valhalla, New York.

Formerly, Dr. Weisburger was an officer in the U.S. Public Health Service, and served as Head of the Carcinogen Screening Section at the National Cancer Institute (NCI) in Bethesda, MD, and Director of the Bioassay Segment of the NCI Carcinogenesis Programs.

Dr. Weisburger is on the editorial boards of numerous scientific and medical journals and has publisned almost 400 papers and reviews dealing generally with the mode of action of carcinogens, with bioassay of suspected carcinogenic agents, and with detailed studies on the etiology of major types of cancer. The overall aim of his program of research is directed towards elucidating the principal causes and modifiers of human cancer and their mechanisms of action with the goal of establishing a sound basis for preventive actions, with emphasis on cancers in the gastrointestinal tract, the respiratory tract, and in the endocrine controlled organs. He is on the list of 1000 Most Cited Authors of the Institute of Scientific Information.

He is, or was, a member or officer of various biochemical, toxicological, and pharmacological associations and societies in the United States and abroad. He was awarded an M.D. degree (honoris causa) by the University of Umea, Sweden. He was elected an Honorary Member of the Japanese Cancer Association. The Society of Toxicology awarded him their Merit Award, and the Michigan Cancer Center honored him with the Meyer and Anna Prentis Award. Dr. Weisburger has served as a keynote or symposium speaker on the topics of Nutrition and Cancer, Mechanisms of Human Cancer Causation, and Effective and Economical Bioassay Systems for Carcinogens. He was a member of the Pancreas Cancer Working Group and the Large Bowel Cancer Project, and served on the Board of the American Cancer Society, Westchester Division. He was appointed to the Council of the European Association for Cancer Research and serves as liaison representative of the American Association for Cancer Research to the European Association.

44th. Edition
WHO'S WHO
1986-1987

WEISBURGER, JOHN HANS, medical researcher; b. Stuttgart, Germany, Sept. 15, 1921; came to U.S., 1943, naturalized, 1944; s. William and Selma (Barth) W.; children—William, Diane, Andrew. A.B., U. Cin., 1947, M.S., 1948, Ph.D., 1949; M.D. (hon.), U. Umea, Sweden, 1980. Biochemist Nat. Cancer Inst., NIH, Bethesda, Md., 1950-61, head carcinogen screening sect., 1961-72; dir. bioassay segment Nat. Cancer Inst., NIH (Carcinogenesis Programs), 1971-72; v.p. research Am. Health Found., Valhalla, N.Y., 1972—; research prof. pathology N.Y. Med. Coll., Valhalla, 1974—; mem. biochemistry and nutrition study sect. NIH, 1957-58; mem. interdepartmental panel on carcinogens FDA, Dept. Agr., USPHS, 1962-71; chmn. subcom. (Nat. Cancer Program Strategic Plan), 1971-74; chmn. carcinogenesis subcom. (Nat. Large Bowel Cancer Project), 1972-75; chmn. subcom. positive controls Nat. Acad. Sci.-NRC Com. on Carcinogen Testing of New Drugs, 1973; mem. expert panel on nitrites and nitrosamines Dept. Agr., 1973-77; chmn. Workshop Colo-rectal Cancer, Union Internat. Contra Cancrum, Geneva, 1975; mem. Nat. Cancer Inst. Clearinghouse on Environ. Carcinogens, 1976-78; program chmn. Toxicology Forum, 1977; dir. Naylor Dana Inst. Editor: Archives of Toxicology, 1977—; mem. editorial bd. Carcinogenesis, 1979— asso. editor. Cancer Research, 1969-80, Jour. Nat. Cancer Inst., 1960-62, mem. editorial bd., Chemico-Biological Interactions, 1969-77, Xenobiotica, 1971—, mem. hon. editorial adv. bd., Food and Cosmetic Toxicology, 1967—. Served with AUS, 1944-46; to col. USPHS, 1950-72. Recipient Def. Service medal, 1964, Meritorious Service medal USPHS HEW, 1970. Fellow N.Y. Acad. Scis., mem. Am. Assn. Cancer Research, European Assn. Cancer Research (council), Am. Chem. Soc., Am. Soc. Biol. Chemists, Am. Soc. Pharmacology and Exptl. Therapeutics, Biochemical Soc. (London), Environ. Mutagen Soc., Soc. Toxicology (chmn. bd. pubs. 1968-71, councilor 1972-74, award of merit 1981), Soc. for Exptl. Biology and Medicine, Japanese Cancer Assn. (hon. life), Am. Soc. Preventive Oncology (founding mem.), Sigma Xi, Alpha Chi Sigma (pres. Washington profl. chpt. 1967-68), Phi Lambda Upsilon. Home: 4 Whitewood Rd White Plains NY 10603 Office: Am Health Found Naylor Dana Inst Valhalla NY 10595 *In my lifetime a revolutionary change occurred in our perception of the causes of the major premature killing diseases—heart disease, hypertension, stroke, many forms of cancer. Tremendous advances stemmed from the partnership between the Federal Govt. and academic institutions that support health research. The impact of these diseases can be reduced in virtually all countries of the world provided their political bodies can agree that peaceful endeavors and cooperation are essential for survival. Medical science now can implement successful prevention efforts. I am glad I have lived through this period and have played a small roll in this development.*

BISHOP'S ORCHARDS

B. W. Bishop & Sons, Inc.
1355 Boston Post Road
Guilford, CT 06437-2399
(203) 453-2338

Statement to Senator Dodd and the Committee on Children.... by Keith B. Bishop, New Haven County Farm Bureau President
March 14, 1989

The United States is the best and most reliable food producing country in the world, and millions of dollars are spent each year to improve the way food is grown, processed and packaged to make it safer and less costly to purchase. It is a known fact that our food is the safest in the world.

Recently, some groups are trying to argue that our food is not safe, and there may be a lifetime risk of getting cancer from eating certain foods or chemicals that are used to grow foods. Most of the information available indicates we need to be concerned and continue to have scientists keep doing studies to get more answers. But in the meantime, the EPA (Environmental Protection Agency) has said that the chemicals in use a safe enough to keep using while more tests are done.

Farmers care about how they grow their food, and most all farmers or their workers have gone to college so they know how to do their jobs, just like most other businesses. The biggest risk of all chemicals is to those who actually use them. Farmers must be very careful, and CT requires special lisencing to apply, purchase and handle pesticides.

Farmers have to eat too, just like you. And they eat more of the food they grow than anyone else. They do not want to use a spray that will hurt them or their children. We are always careful when applying these sprays.

We as farmers have been using less sprays, and want to use fewer still. Many farmers are trying to use organic methods of control. It costs many dollars to spray, and farmers do not want to waste their money if they do not have to spray. Spraying is only done when it is absolutely necessary to protect the crop.

Farmers cannot sit back and watch their hard work and income destroyed by pests and diseases.

Farmers have stopped using many of the sprays that are being talked about now, and are and will try using other methods of control as they are available.

We are direct sellers of our own fruit through our FARM MARKET, with little going wholesale. We have deluged with questions since Jan. 31, and have found that 95 % of the customers asking have been satisfied with our concerns, our handling of their inquiries and have faith in our integrity and use of chemicals. Most recognize the high psychic nature of those being publized and the NRDC, and feel they are overstating the case.

We are all concerned. But it is getting to be an obsession, and out of a risk benefit situation. We all need to eat, and chemicals by there very nature are what make up food. So there will always be danger, and what price are we willing to pay?

Several fruit farms in CT are deciding to go out of farming now that this has hit us. This is the straw that breaks the back. Where do we want our food grown, and the open space and rural scenes of farms? Lets sit back and take a long look at the situation as we want it in the future before making laws and regulations that make this country more dependent on fewer and larger farmers, who can then manipulate the food chain.

BISHOP'S ORCHARDS

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Questions submitted to Senator Dodd to ask at hearing on March 16, 1989 by Bishop's Orchards, Guilford, CT.

Keith, Jon, Gene and Al Bishop, owners of this fifth generation farm, in the family since 1871, producing 30-50,000 bushels of apples per year..

1. What is your definition of organic?

2. What do you know about current IPM techniques?
   Describe how naturally occuring insecticides like pyrethrin (a broad spectrum insecticide) will fit in such a system.
   How can we stop resistance building to the limited number of natural insecticides.

3. What alternative controls are available for apple scab, powdery mildew, black rot, sooty blotch, flyspeck, and blossom end rot?
   Failure to control them does not mean less attractive fruit, but means the tree drops the fruit before maturity, and means no fruit. How can we grow fruit and solve this problem?

4. Have you operated a farm?
   Have you lived on a farm?
   Have you applied pesticides or sprays to any crops including fruit, vegetables, flowers, lawn or used sprays inside your home to control insects or rodents?

5. Have you attempted to sensibly visit with any of Conn. fruit growers to find out their concerns and answers to your questions?

6. Explain how growers can grow as much food with no pesticides as they are with them as she has been quoted to say.

7. Do you know what it costs a grower to spray one application? one acre? or the total costs to grow an acre of apples?
   Don't you think that growers are concerned with costs?
   The less growers spray, the happier we are. Most if not all growers would gladly abandon their use if it was possible.

8. IPM techniques already in use advocate the use of economic thresholds for determining if a pesticide application will provide a net gain for the grower. If an economic benefit is already a determining factor, how would her program increase production and lower production costs?

9. Which specific studies did NRDC use to arrive at their conclusion?
   Has this data been reviewed by any other scientific group which concurred with the findings? If so, who?

10. Have any scientific groups disagreed with their conclusions? If so, why?

11. Do you think growers are concerned about what and how they spray?

12. Farmers usually want to transfer their farms to their children? Don't you think they care for the health of their children who eat their own produce? Don't you think they want to keep their farm from being contaminated?

United States Department of Agriculture

Food and Nutrition Service

3101 Park Center Drive
Alexandria, VA 22302

Reply to
Attn. of:

Subject: Update on Alar on Apples

To: Regional Administrators
All Regions

This is to provide you with the latest information available to us on the issues raised by the Natural Resources Defense Council (NRDC) and the recent media attention regarding the treatment of apples with the chemical daminozide (trade name Alar). This supplements information already provided your Program Directors and Public Information Staff.

Apples are a nutritious food; there is no reason to stop eating apples or apple products. While the Government cannot assure that any food is absolutely free of risk, on the basis of current information we believe apples to be safe. We do not advocate the removal of apples or apple products from school lunch menus.

We have consulted with appropriate officials in the Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA). As you know, EPA is responsible for determining whether chemicals like Alar can be legally used and in what amounts.

EPA has indicated that the NRDC assertion "seriously misleads the public." EPA also indicated "NRDC's estimates of risk posed by pesticide residues in food are far out of line with existing data."

Please pass this information on to your State agencies immediately so that they can be as responsive as possible to questions and concerns raised by local school districts and others. In addition, State agencies should be directed to provide the information to their local school districts.

G. Scott Dunn

G. SCOTT DUNN
Acting Administrator

CHAZY ORCHARDS INC.

WE DELIVER EVERYWHERE

RT. 9 - P.O. BOX 3[illegible]
CHAZY, N.Y. 129[illegible]

March 15, 1989

Mr. Robert Petrausch
Uniroyal Chemical Co., Inc.
World Headquarters
Benson Road
Middlebury, CT 06749

Dear Bob:

If there was one ounce of scientific data to support the NRDC attack on Alar I would be the first to eliminate this product from my spray program, in spite of the fact that it prevents over 50,000 boxes of apples from going on the ground each year at Chazy Orchards. Do you think that I would let my grandchildren run freely in the orchard and storage and gobble up 2 or 3 apples a day apiece if I thought there was anything wrong with them.

I purchased Chazy Orchards in 1970 with a large loan from Farm Credit Service. I would not even have attempted this without Alar as Chazy Orchards is 85% McIntosh and was a losing proposition all its life to the previous owners because most of the crop fell on the ground before it could be harvested. Alar just does not make the apples redder for McIntosh growers, it is an essential part of our production operation which makes it possible to hold these apples on the tree until they can be picked. I don't think any other variety drops so quickly and is so dependant upon Alar for its existence.

We would be more than willing to absorb any financial loss necessary if Alar could be honestly proven harmful. However, I take strong exception to be intimidated by the NRDC who apparently has enough money to hire expensive lawyers, movie stars and influence national news media with their distorted facts.

I estimate conservatively that without Alar we would:

1. Provide 10,000 hours less of work annually for our year-round work force.

2. Purchase $100,000, or more, fewer packing supplies from New York State manufacturers.

3. Ship 60 less truck loads of apples amounting to $60,000 loss of income to the trucking industry.

4. Cause a spinoff loss to other handlers of apples in the marketing chain of $50,000.

5. Seriously limit annual capital expenditures resulting in an indeterminable loss to local contractors and suppliers.

In the small community of Chazy alone, the loss of wages in our industry alone would have a negative effect on suppliers of services all down the line.

If there was any good reason for this loss to happen I could understand and accept it. If we continue to allow these environmental extremists to distort the facts and scare the whole nation into thinking that their food supply is tainted then something is seriously wrong with our system of government.

Sincerely,

Donald F. French Jr

Carlson Orchards, Inc.
115 Oak Hill Road
P.O. Box 359
Harvard, MA 01451
617-456-3916

Carlson Orchards Roadside Stand, Inc.
215 Ayer Road (Rt. 110)
P.O. Box 359
Harvard, MA 01451
617-456-8263

March 15, 1989

Uniroyal Chem. Co., Inc.
74 Amity Rd
Bethany, Conn. 06525

To whom it may concern;

I would like to relate to you our experience of using no Alar on our entire crop in 1986. The 1986 Apple crop cost Carlson Orchards, Inc. $150,000, by the end of our marketing season. Pre-harvest drop amounted to approximately 25% of our total production. When the hand picked fruit was packed out, about 30% went to juice because of poor color or condition and 20% was downgraded from U.S. Extra Fancy down to U.S. No1 or Fancy. Each time an apple is downgraded the price drops dramatically.

In summary, without the use of Alar, our commercial production of the McIntosh variety which is one of the best today, will have to be reduced significantly so that we can harvest the crop quickly and any older orchards will have to be abandoned.

Sincerely, Carlson

45,000 Trees—Mostly McIntosh and Cortland

Forrence Orchards, Inc.

Growers and Packers of Fancy Apples
Peru, New York 12972

Roger Forrence, *President*
Virgil H. Forrence, *Vice President*
William H. Forrence, *Secretary*

Telephone 518-643-9527
Regular and C. A. Storage
60,000 225,000

March 15, 1989

Mr. Robert Petrausch
Public Relations Director
Uniroyal

As apple growers we are very concerned about the possible ban of Alar. Alar has played a very big part in the success of our operation. If Alar was taken off the market our business could lose upwards to one million dollars per year.

If this product is truly cancer causing, it should be banned. But we would like to see all the facts presented first.

Forrence Orchards, Inc.

Senator ADAMS. I thank all of you very much for appearing this morning, all of the panel members from the various panels that have been here.

The subcommittee will stand in recess subject to the call of the chair.

[Whereupon, at 2:02 p.m., the subcommittee was adjourned.]

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